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ORIGINAL ARTICLES.

A STUDY OF A BACILLUS RESEMBLING THE BACILLUS OF SHIGA, FROM A CASE OF FATAL DIARRHEA IN A CHILD; WITH REMARKS ON THE RECOGNITION OF DYSENTERY, TYPHOID, AND ALLIED BACILLI.*

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SEVERAL reasons have led us to report the results of our study of the organism isolated from this case of fatal diarrhea. Chief among these is the vital importance of establishing beyond doubt the etiology of the various forms of diarrheas and dysenteries. Upon such establishment of etiology must ultimately depend the rationale of hygienic, diagnostic, and therapeutic measures—especially those of serumtherapy, and diagnosis by serum reactions—upon which the recognition and cure of the disease or protection from the infective agent must be based. Moreover, there is the greatest need, in the present state of our knowledge of the etiology of dysentery, of the most careful study, description, and especially comparison of the bacterial forms supposed, in different cases and various localities, to be of etiological significance in the same or various forms of this disease.

As will be brought out more fully in detailing the peculiarities of the organism we are about to describe, the organisms isolated from cases of dysentery—apart from a determination of superficial resemblance in growth characters on the usual nutrient media and their reactions in the presence of the more commonly employed sugars—dextrose, lactose, and saccharose—have been largely identified by their supposed specific agglutination reactions in the presence of serum from dysentery patients and immunized animals. That there are serous objections to placing too complete confidence in such measures alone, we believe will appear from our study.

The bacillus of acute dysentery, or diphtheritic colitis, first described by Shiga[1] in 1898 as etiologically connected with the disease in Japan, and the bacillus isolated by Kruse[2] in 1900, from the same disease in Germany, have finally, after much comparison and discussion of minute differences, been recognized as identical species. Under the stimulus of Flexner's[3] work, the same species has undoubtedly been isolated from cases occurring in America, as is shown by the corresponding cultural characters and serum reactions of the organism isolated in New Haven[4], Conn., and known as culture "New Haven." Flexner's culture, isolated by him in 1899 while in the Philippines, is not admitted by all observers to be identical with the preceding, although Kruse—aside from the general weaker growth of the Flexner bacillus, and minor differences in its agglutinating reactions, which are, as a rule, less marked in serum from dysentery cases than the reactions of "Shiga," "Kruse" and the "New Haven" cultures—could determine no specific differences, and concluded that the variation was not greater than that occurring among various true typhoid cultures. Shiga[5], in his latest article, is practically of the same opinion, and claims to have gotten similar reactions to those given by Flexner's bacillus with cultures of his own, when these were grown for several generations in milk. From this he believes the Flexner bacillus to be simply a slightly modified form of the true *bacillus dysenteriae.*

Martini and Lentz[6], however, and particularly Lentz[7] in a separate article on the cultural differentiation of these organisms, claim to have found not only discrepancies in agglutination, but cultural differences of fixed value in the Flexner bacillus, as brought out in mannite-litmus agar (Drigalski's medium). To a discussion of this point we shall return later.

The bacillus which we are about to describe was isolated from the contents of a section of the colon of a child dead of an acute diarrhea. The patient was a child about one year old, who suffered from an attack of enterocolitis. The temperature was not high, never over one hundred. There was persistent diarrhea, from four to six stools every day. For the most part they were green and contained mucus. In the history there was no mention of any blood in the stools. The child lost strength progressively and died in two weeks.* [We are indebted to Dr. David Bovaird for the material examined, and desire here to express our appreciation of his interest in this work.]

Method of Isolating the Organism.—The method employed by us for isolating the organism was as follows: The contents and scrapings from the mucosa of the gut were diluted in broth and platings were made from this emulsion by transferring one to several loopfuls to the medium recommended by one of us (Hiss)[8] for isolating the bacillus of typhoid fever.† In this medium

*Read at the regular Meeting of the New York Pathological Society, January 14, 1903.

*Since making this communication another case of fatal enterocolitis, in a child of nine months, has been investigated by me, and a bacillus of the same species as the one here described recovered from the gut contents.—*Hiss.*

†This medium is composed of agar, 15 gm.; gelatin 15 gm.; Liebig's meat extract, 5 gm.; sodium chloride, 5 gm.; dextrose, 10 gm. No acid or alkali is added. See ref. 8, p. 156.

the colonies of the bacillus of Shiga do not form threads, as do the typhoid bacilli, and may usually be distinguished from the colonies of colon bacilli and allied forms by being smaller and lighter in color. Transplants were made from the small, light-colored, transparent colonies which were present, into tubes of the semisolid medium described by Hiss* in 1897. By the use of this medium, which appears to us much superior to the glucose agar recommended by other workers, organisms corresponding in character to the Shiga bacillus may be readily recognized. In this semisolid medium, when incubated at 37° C., the bacillus of Shiga, possessing no active motility, does not spread in the medium and cloud it, but growth is confined to the original line of inoculation. Neither does the dysentery bacillus form gas in the medium, from the one per cent. of glucose, which is present. All colon bacilli form gas in the medium and are also distinguished by other characters, more or less marked, which depend upon their degree of motility. Typhoid bacilli are readily differentiated by clouding the medium uniformly.

If some such semisolid medium as this had been employed, instead of dependence being placed on the microscopic test alone, much of the uncertainty and consequent discussion regarding the motility or non-motility of the bacilli described by Shiga and Flexner, it seems to us, might have been avoided.

As pointed out by Hiss some time ago, the character of the growth of the bacillus of Shiga in this semisolid medium in tubes and its inability to form threads in the typhoid plating medium were among the exceedingly few cultural characters until recently known by which this organism could be separated from the bacillus of typhoid fever.*

Description of the Bacillus.—An organism answering to the characters shown in the semisolid medium by the Shiga bacillus was found to be present in the gut contents of our case, and was subjected to various tests to determine, if possible, its further identity with various cultures of Shiga's bacillus. Three cultures of this organism sent to us by Professor Flexner have been studied. These, as has been stated, are the cultures known as "Kruse," "Flexner," and "New Haven." "Kruse" is the culture isolated during an epidemic in Germany. "Flexner" is, we believe, one of the cultures obtained by Professor Flexner while in the Philippines, and "New Haven," sometimes referred to as "Seward," was from a case of dysentery occurring in New Haven, Conn.

Morphology.—The organism is a short, fairly stout bacillus, with rounded ends, in some cultures almost coccoid in form. It occurs singly, but often in pairs, and rarely short threads may be seen. There is a tendency in some preparations to occur in clumps. The bacillus stains with the anilin dyes, but as is the case with Shiga's bacillus, the staining of all the bacilli in a preparation is not equally intense. Near well-stained individuals it is the rule to find many which have taken the dye very poorly. The staining of the protoplasm of individual bacilli is also at times irregular. The organism is decolorized by Gram's method. Spore formation has not been observed. The bacillus is not motile. Flagella stainings have not, so far, been made. No capsules have been noted.

In general morphology and staining reactions the organism answers most closely to that of the dysentery bacilli as represented by Kruse's culture. Flexner's bacillus is not so stout and is longer than ours, thus corresponding morphologically more closely to the bacillus of typhoid fever.

Cultural Characters.—The bacillus grows well on the usual culture media, and corresponds on these in all essential respects to the Shiga bacillus. Gelatin is not fluidified; nor is indol, according to our tests, produced. On the usual nutrient broth, which is clouded uniformly by the growth, a small pellicle may be formed after ten or twelve days at 37° C. When a fermentable sugar is present in the broth no pellicle is formed. The same observation holds good for typhoid and colon bacilli. This absence of pellicle is probably accounted for by the ease of obtaining oxygen from the sugar and subsequent inhibition of growth by acid production. A failure to recognize this fact has undoubtedly led to discrepancies in descriptions of organisms. Some facultative organisms, usually not forming pellicles, will do so in sugar free media, or at all events grow more abundantly in the upper portions where the necessary oxygen is present. None of our cultures of true *Bacillus dysenteriæ* have, however, formed pellicles.

Fermentation Tests.—A study of the organism in dextrose, lactose, and saccharose bouillon in fermentation tubes shows a complete correspondence with the bacillus of Shiga, as represented by the cultures "Kruse," "New Haven," and "Flexner." All of these organisms ferment dextrose with the formation of acid and a clouding of the open and closed branch of the fermentation tube. Neither lactose nor saccharose are fermented by any of these organisms, hence are not available for anaerobic growth, and the closed branch of the tube remains clear. These bacilli are not able to grow anaerobically in broth not containing some available carbohydrate or allied source of oxygen supply.

It has been the common practice in our laboratory for several years past to test organisms, especially those of the typhoid, Gärtner, and colon groups, in one per cent. mannite broth in fermentation tubes. A test of organisms in this medium has in our hands always served to differentiate cultures of Shiga's bacillus—"Kruse," "New Haven," and "Flexner"—from typhoid bacilli. This point was first noted about two years ago in our laboratory by Dr. Charles Norris, who in observing the fermentative activities of certain members of the typhoid and Gärtner

*Hiss: Jour. Med. Research, 1902, VIII, p. 165.

groups, tested the cultures "Kruse" and "Flexner" sent to us by Dr. Flexner early in 1901, shortly after his return from the Philippines. Typhoid bacilli, Norris found, utilized mannite with acid production and clouded the closed branch of the fermentation tube, while the dysentery cultures could not ferment mannite, and did not grow in and cloud the closed branch of the tube, which in glucose free broth always remained clear.

The organism isolated by us when grown thus in mannite does not correspond in its action to the cultures "Kruse," "New Haven" and "Flexner," but ferments mannite and clouds the closed branch of the tube, as do the typhoid bacilli. In bouillon made from maltose of high purity it can, however, be differentiated from typhoid cultures. Typhoid cultures ferment maltose with acid production and cloud the closed branch of the fermentation tube, while our organism does not ferment maltose nor cloud the closed branch.

It is well to note that cultures of Petruchsky's *Bacillus fecalis alkaligenes* can be distinguished from dysentery, typhoid, and allied bacilli by its inability to ferment any known carbohydrate (at least, anerobically) or to cloud the closed branch of the fermentation tube.

Serum-Water Media.—A most striking differentiation of organisms belonging to the dysentery, typhoid, Gärtner, and colon groups is afforded by a study of these organisms in serum-water media. This medium as a basis for studying fermentative activities was devised by one of us (Hiss)[10] for use in the differentiating of pneumococci from streptococci.

The medium is composed of clear beef serum, one part, and distilled water, two parts.* This mixture can be boiled without causing a coagulation of the albuminous bodies present. The medium after boiling is an opalescent fluid. As was pointed out in the original communication on this subject, this medium is practically, if not absolutely, sugar free. The original monosaccharid content of the blood is rapidly destroyed after drawing, by the action of the so-called glycolytic ferment of the blood. That this is still active in serum may be demonstrated by adding small amounts of dextrose to sterile serum, and then allowing this to digest at 37° C. for an hour or so. Subsequent fermentation tests with organisms will show that the sugar has entirely or partially disappeared, according to the amount added, as determined by acid or gas production. In using the medium as a basis for fermentation tests it is necessary to boil it before adding the sugars, as many of these are acted upon by the enzymes of the blood—diastase—maltase (glucase), etc. This may also be easily demonstrated by digesting the sugar, especially dextrin and maltose, for a short while in the unheated serum-water mixture, maltose being rapidly destroyed and split into dextrose, and dextrin quickly changed into maltose and then to dextrose. The medium is therefore made by first heating the serum water at 100° C. for a short time, and then adding usually one per cent. of the sugar desired. To this is added litmus solution (Merck's highly pure litmus, five-per-cent. solution in water) in the proportion of one per cent. The medium is then tubed and may be sterilized at 100° C. for ten minutes in three consecutive days without fear of changes taking place in the sugar from the application of the heat. The sugars so far tested by us are dextrose, galactose, mannite, maltose, lactose, saccharose and dextrin. These sugars serve eminently well to differentiate our organism from the dysentery bacillus of Shiga, and also to distinguish between these and organisms of closely allied characters, such as typhoid bacilli, *Bacillus fecalis alkaligenes*, colon and the organisms of the Gärtner group. This is shown by the following tests of organisms:

Bacillus fecalis alkaligenes: None of the sugars are fermented; all of the media remain blue and unchanged.

Bacillus Shigæ: Dextrose and *galactose* are fermented with acid formation as shown by a reddening and solid coagulation of the medium. Mannite, maltose, lactose, saccharose and dextrin are not fermented, the media remaining blue and fluid. This is true of "Kruse," "New Haven" and "Flexner."

Bacillus "Y" (Hiss and Russell): *Dextrose, galactose* and *mannite* are fermented with acid production, as shown by reddening and coagulation of the media. The fermentation of mannite differentiates this organism from Bacillus Shigæ, as represented by the cultures "Kruse," "New Haven" and "Flexner." The maltose, lactose, saccharose and dextrin tubes remain fluid and blue.

Bacillus "48": From stool of typhoid fever in 1897. Same reaction as above with the exception that the mannite medium is not coagulated throughout the entire depth, but shows a blue fluid layer at the top. This organism, however, is actively motile and thus further distinguished from "Y."

Bacillus typhosus: Dextrose, galactose, mannite and *maltose* and *dextrin* are fermented with acid production, as shown by a reddening and solidification of the media. *Dextrin* tubes first show a change to purple, and later coagulate in the lower portion leaving for some time a blue fluid layer above. Lactose and saccharose media remain unchanged and blue. The fermentation of maltose and of the dextrin medium serve to differentiate typhoid cultures from our organism "Y" and from the culture "48."

Bacillus "48" deserves further mention. It was isolated by Hiss in 1897 from the feces of a New York hospital patient supposed to be suffering from typhoid fever, and was thought at first to be a true typhoid bacillus, but was subsequently looked upon as doubtful, as it did not form thready colonies in the typhoid plating medium and, although clouding the tube medium uniformly, without gas production, formed a thin pellicle at the surface of the medium. This is never the case with true typhoid cultures. It has been preserved in sealed tubes until a short time ago when it was re-examined and found to differ from typhoid bacilli in its action on maltose and

*Beef serum, one part; distilled water, three parts; is better as it is less opalescent.

dextrin. Although its sugar reactions correspond very closely to those of our bacillus "Y," it is, as above noted to be, readily distinguished from it by its motility.

Agglutinating Reactions.—Unfortunately we were not able to obtain a specimen of blood or serum from the patient from whose intestine our bacillus was isolated, so that a most important link in the chain of etiological evidence is lacking. A study of the agglutinating reactions of the bacillus have, however, been made with various normal and immune sera, and with the serum of an animal immunized with the bacillus itself. The following interesting, and it seems to us, very important results have been obtained.

Normal Human Blood.—The results of tests against supposedly normal human sera were as follows:

Serum A.—Adult man, in good health; no history of bad diarrheic or dysenteric attack. This serum did not agglutinate the bacillus in any dilution.

Serum B.—Placental blood. No history furnished. Positive reaction 1-20, two hours. 1-30, two hours was negative.

Serum C.—Adult man, in good health. Two years ago while in Porto Rico suffered from a prolonged attack of diarrhea, which was not, however, considered dysenteric in character. Positive reaction, 1-80, in two hours. Negative, 1-100, in four hours. This serum, on account of the previous diarrhea, probably should be excluded from the normal list.

Human Sera, Dysentery: Serum A.—From a soldier with chronic dysentery. Acute attack in the Philippines two years ago. Another attack subsequently in Porto Rico. Positive reaction with our bacillus, 1-20, one hour. "Flexner" did not react at 1-20. "Kruse," — 1-10, — 1-40; "New Haven," + 1-10, +1-20, — 1-40.

Serum B.—From a soldier with chronic dysentery. Sent to us from the military hospital in Washington. Acute attack of dysentery in the Philippines two years ago. Our organism reacted 1-40, one-half hour. "Flexner" gave no reaction. "Kruse" was positive 1-20; minus, 1-40, one and one-half hours. "New Haven" positive 1-20; negative, 1-40, one and one-half hours.

Normal Horse Serum— Bacillus "Y," +1-40, one-half hour; + — 1-80. "Kruse," + 1-20, + — 1-40.

Dysentery Horse Serum.—From a horse immunized against culture "New Haven." Sent to us by Professor Flexner:

Bacillus "Y," +1-400, + — 1-500, twenty hours.

"New Haven," +1-100, + — 1-200, twenty hours.

"Flexner," +1-40, —1-200, twenty hours.

Bacillus "48," —1-1, —1-50, twenty hours.

Bacillus typhosus, + — 1-20.

Normal Rabbit Serum.—Bacillus "Y," + — 1-2; — 1-10. 1-20. 1-100, two hours.

Typhoid Rabbit Serum.—Highly immunized against typhoid. Exact titration against typhoid originally 1-20,000.

Bacillus "Y," +1-500; +1-4,000.

"New Haven," —1-20.

Bacillus "48," —1-25 and 1-100, twenty hours.

"Y" Rabbit Serum.—This animal received several inoculations of boiled cultures of "Y." The serum agglutinated "Y" in dilutions as high as 1-500. "Kruse," "New Haven" and "Flexner" did not react in any dilution (—1-10; —1-500). Bacillus "48" also showed no agglutination. *Bacillus typhosus* reacted at 1-80; + — 1-100, in twenty hours.

Normal Beef Serum:

Bacillus "Y," +1-200; +1-320, four hours.

"Flexner," +1-10; — 1-20.

"New Haven," +1-10; — 1-20.

"Kruse," +1-10; — 1-20.

Bacillus typhosus, +1-40; +1-80, twenty hours.

The results of these serum tests are important and indicate to us, after a careful search of the literature of dysentery, that we are in all probability dealing with an organism not hitherto described. It is readily seen from our tests that "Y" agglutinates with dysentery serum from human infections and from immunized animals in most instances quite as well as, and in some better, than do bacilli fully identified in all respects with the bacillus of Shiga. The various dysentery-like bacilli described by other observers, although showing some agglutination in the presence of dysentery sera, have been agglutinated to a markedly less degree than true dysentery bacilli, and for this reason alone have in several instances been excluded from recognition as fully identical with Shiga's bacillus. This is true of the organism described by Kruse as the bacillus of pseudodysentery of the insane. The organisms placed in this class were, according to him, so far as he could determine, in all respects similar to his and Shiga's dysentery bacillus in cultural characters. They were differentiated by not agglutinating with true dysentery serum, but with the serum from the insane patients. The true bacillus of Shiga, on the other hand, did not agglutinate with these sera in the same dilutions. These pseudodysentery cultures were agglutinated in normal sera in 1-50, which is higher than that usually shown by the true dysentery bacillus. Kruse found that his true dysentery organism agglutinated in normal sera as high as 1-20, and exceptionally 1-50. In his later paper, however, he thinks this may have been due to previous infection.

Another point of interest is the high agglutination of our bacillus with sera from animals immunized against typhoid. Here "Y" shows a very close relationship to the bacillus of typhoid. This bond is strengthened by the fact that typhoid cultures also show fair agglutination in "Y" immune serum. Both Shiga's bacillus and typhoid call forth agglutinins which have an affinity for the receptors of our bacillus "Y." "Y" immune serum, on the other hand, contains some agglutinins active for typhoid bacilli, but none, so far

+ — indicates a partial reaction.

as our experiments go, which affect Shiga's bacillus.

"Y" and typhoid bacilli, therefore, call forth some agglutinins in common or have receptors capable of anchoring certain agglutinins of each. "Y," it may be, anchors all of the agglutinins called forth by Shiga's bacillus and probably other agglutinins normally present in the serum tested. This is indicated by its higher agglutination in the dysentery horse serum than that shown by the dysentery cultures themselves. This is the case; or it has fewer receptors that have to be satisfied before agglutination takes place. The same phenomenon is probably illustrated by our organism and typhoid bacilli in normal beef serum. There are agglutinins present in the serum active for both typhoid and "Y." Our organism "Y" is, however, agglutinated in much higher dilutions than the typhoid bacillus, showing that there is much more "Y" agglutinating substance present, or that "Y" is agglutinated with fewer receptors satisfied than is the typhoid bacillus.

The action of beef serum is important, as it may be found to afford a practical means of differentiating true Shiga bacilli from organisms of the "Y" type. Shiga's bacillus, as above noted, does not agglutinate in beef serum to an appreciable degree.

These facts brought out in regard to the serum reactions of "Y," dysentery, and typhoid bacilli, have important practical bearings. Unless careful studies are made of all organisms resembling Shiga's bacillus, gross errors may occur in serum diagnoses based upon the use of such organisms in testing reactions; and errors may also occur in identifying such organisms themselves by simple tests against dysentery serum. This is illustrated by the fact that "Y" agglutinates better even than the true Shiga bacillus in dysentery serum, and unless true Shiga bacilli are tested against immune "Y" serum they may not be differentiated from each other. It is more than probable that organisms corresponding to "Y" have already been isolated and not recognized as distinct from Shiga's bacillus. This may then lead to the converse mistake of establishing the identity of a dysenteric or diarrheic attack with true dysentery by agglutinations obtained by the use of a bacillus differing from the supposed etiological organisms.

These remarks are not meant to convey the impression that "Y" itself is not or may not be found to be etiologically related to some form of dysenteric or diarrheic disease, but are intended to bring out the fallacy of relying solely upon serum reactions in identifying either disease or organism. It is fortunate, therefore, that the study of cultural characters has aided us in the recognition of differences in these organisms and may be of further service in the recognition and grouping of new organisms as they are discovered.

It seems to us in the face of our knowledge of the discrepancies in degree of agglutinability of such well-known organisms as typhoid bacilli, which not only show variations among the different cultures, but in the same species under practically non-determinable culture conditions, that we should hesitate before placing too much confidence in differences determined by serum reactions alone, but should endeavor in all cases by careful and extended study to establish their identity or dissimilarity by every cultural and biochemical test available.

Arguing from the analogy of our work on immune animal sera, an infection due to a bacillus of the "Y" species might, if tested against typhoid bacilli, give a reaction in a dilution considered diagnostic, and sera from both dysenteric and typhoid patients, when tested against "Y," would certainly give reactions in high dilutions. Conversely, "Y" might be identified either with typhoid or Shiga bacilli if dependence were placed on serum reactions alone in its recognition.

Pathogenicity.—Our bacillus is pathogenic for both rabbits and guinea-pigs, but not markedly so. No characteristic lesions have so far been noted. Some hyperemia of the small intestine is apparent. Rabbits may be readily accustomed to large doses of living cultures without showing a marked loss in weight.

As noted earlier in this paper, Lentz in a cultural study of a large number of true Shiga bacilli and other more or less closely allied organisms isolated from dysenteric patients, claims to have been able to separate by the use of a mannite litmus agar the cultures, which he designates as "Flexner I," "Flexner Manila" and "Strong," from the true bacillus of Shiga and Kruse. The results of his tests indicated that grown in this medium. Shiga's bacillus does not give rise to changes in the medium, with the exception of a decolorization of the medium in its lower layers, the medium remaining of the normal blue or deep purple in the upper section. In the media inoculated with the Flexner and Strong bacilli, the color changes to a distinct red, due to acid-production.

We have endeavored to repeat Lentz's experiments. The medium used by him in his earlier experiments was made according to the formula given by Drigalski for his typhoid isolation medium, with the substitution of mannite for the lactose. In Lentz's article on Dysentery in Kolle and Wassermann's Handbuch der Pathogenen Mikro-organismen (p. 321) the method of preparation is somewhat simplified. This last method is the one followed by us.

At the present moment we are unable to say whether our culture "Flexner" is one of the organisms designated by Lentz as "Flexner I" or "Flexner Manila." The tests of our culture "Flexner" on Lentz's medium do not, however, agree with his published results.

[NOTE.—Since writing the above I have had the opportunity, through the kindness of Dr. Flexner, of examining the cultures "Flexner Manila (Harris)" and "Flexner Manila (Gray)"

and Strong's Manila culture. These are the cultures examined by Martini and Lentz; and the culture "Flexner" examined by us is, according to our tests, not one of them. Both of Flexner's Manila cultures, as well as that of Strong, differ from the true Shiga bacillus in fermenting mannite, as shown by acid production. Strong's bacillus may be identical with our organism "Y," but has not been under observation long enough for us to speak positively. Flexner's Manila cultures as well as one of his Baltimore cultures (sent to me by Dr. W. H. Park) is further differentiated from Shiga's bacillus and from our bacillus "Y" and Strong's culture by fermenting maltose. Saccharose is also fermented with acid production by Flexner's Manila cultures and by the culture "Baltimore." My tests also indicate that these bacilli will produce acid in the presence of dextrin. Their fermentation of saccharose and the absence of active motility separates them from *Bacillus typhosus*. Their fermentation of maltose, saccharose and dextrin is slower than their action on dextrose and mannite, and may not be apparent for some days. Control saccharose tubes inoculated with *Bacillus typhosus* show no change, so that this cannot be attributed to the presence of dextrose derived from the splitting of saccharose in the preparation of the medium. Control tubes of maltose and dextrin inoculated with Bacillus "Y" and Shiga's bacillus also remain blue and unchanged.

We have, then, apparently, three groups of organisms. One represented by the true Shiga bacillus, fermenting dextrose and some other monosaccharids; one by our organism "Y," fermenting dextrose (monosaccharids) and the alcohol mannite; and finally a group represented by the more active fermenters—Flexner's Manila cultures and the culture "Baltimore"—organisms which split dextrose, mannite, maltose, dextrin and saccharose with the production of acid, as indicated by the reddening and coagulation of the serum-water sugar media.

This study shows plainly the inadvisability of relying upon superficial characters or agglutination tests alone in the identification of an organism, or on the serum tests in the determination of the special character of a disease, and also lends support to our supposition that organisms differing from the true Shiga bacillus have been isolated and confounded with this organism.—*Hiss.*]

Flexner's bacillus gives identically the same reaction in Lentz's litmus mannite agar as the results obtained when "Kruse" and "New Haven" are tested. The culture medium of Lentz, which is used in tubes and inoculated by central puncture, in all three instances became slightly reddened below, but remained blue at the surface. The medium in Lentz's experiments with Flexner's bacillus reddened.

Our bacillus "Y" and the organism "48," as well as true typhoid bacilli when grown in the medium give rise to a reddening of the medium throughout its entire depth. These results were what we naturally expected from our knowledge of the metabolism of these organisms. "Kruse," "New Haven" and "Flexner" do not utilize mannite either in the presence or absence of oxygen, or give rise to acid from it. Bacillus "Y" and "48" and typhoid bacilli ferment mannite with rapid production of acid, and hence redden the entire medium. This was to be expected from their fermentation tube reactions and the results of our experiments with serum-water plus mannite.

An explanation of these discrepant results may, however, be found in the fact, which seems to have escaped the notice of both Drigalski and Lentz, that the medium to which they add sugars, such as mannite, lactose, etc., to be tested, is *not* glucose free. No mention is made of the removal of muscle sugar from the nutrient infusion used by them, nor is this recommended in the directions for preparing the medium. The presence of a fermentable substance, not mannite, in Lentz's medium, is clearly demonstrated by the reddening and possible subsequent clearing of the lower portion of the medium when tested with our cultures "Kruse," "New Haven" and "Flexner," which do not ferment mannite. That the medium remains blue at the top simply indicates that in the presence of oxygen the alkali production neutralized or exceeded the production of acid.

We have made up samples of the medium from sugar-free meat infusion and find that in tests of cultures "Kruse," "New Haven" and "Flexner" no reddening of any portion of the medium occurs. Furthermore, when the medium is used soon after heating, the usual absorbed oxygen being then absent, the growth is confined to the surface, or upper parts of the inoculation line, since these organisms do not grow anaerobically in the presence of mannite in otherwise sugar-free media. In tests of mannite fermenting organisms such as "Y," "48" and typhoid bacilli, the glucose-free mannite medium is found reddened throughout, and growth has taken place along the entire length of the inoculation puncture.

None of the results of Lentz's sugar tests, although they may be roughly indicative, can be scientifically reliable so long as the medium used by him contains this original sugar, and the justice of our criticism of his method is evident in the discrepancies noted by Lentz* himself between the action of colon bacilli on media made by him and the results obtained by Drigalski with colon bacilli. Furthermore, slight differences in the initial reaction of the medium (alkali content), which are unavoidable with their method of neutralization and alkalinization, would also determine differences in their color reactions.

Résumé.—To review briefly: We have in this paper described an organism from a case of fatal diarrhea in an infant. This organism agglutinates in high dilutions with the serum from dysentery patients and animals immunized with Shiga bacilli. Formerly this

*See foot note by Lentz; Zeitsch. f. Hyg., 1902, XLI, pp. 560, 561.

bacillus "Y" could not have been differentiated by valid culture tests from the bacillus of Shiga, and, the mannite test being unknown, might easily have been confounded with Shiga's organism unless its agglutinating reactions had been carefully studied in such a serum as that from typhoid immune animals, or from the normal beef, in neither of which the true Shiga bacillus, according to our tests, agglutinates in appreciable dilutions.

The bacillus described by us is also closely related to *Bacillus typhosus*, both in agglutinating reactions and in the usually observed cultural characters, but can be separated from it by the absence of motility and by its reactions in the maltose and dextrin media employed by us.

This bacillus apparently differs from all hitherto described dysentery-like or "pseudodysentery" bacilli, in its agglutination in high dilutions of dysentery serum, an agglutination in some instances more marked than that shown by the true Shiga bacillus.. A description of this organism, apart from its connection, which may or may not be etiological, with the case of diarrhea, has seemed to us important, since tests of its ability to agglutinate—too often alone relied upon—might lead to its being confounded with Shiga's bacillus. A subsequent use of such an organism for serum diagnosis might thus give rise not only to confusion in determining the "specific" character of a disease, but to untoward results in the application of serumtherapy.

Its etiological significance we have not been able to determine, but its close physiological connection with the dysentery bacillus on one side and the bacillus of typhoid fever on the other make it not improbable that further research will show it to be associated etiologically with certain diarrheic or dysenteric attacks.

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Efficiency of Agurin.—The number of diuretics which stand at the disposal of the physician is not a large one, so that the introduction of agurin was received with favor. This drug, which is a combination of sodium theobromate with sodium acetate, has been very carefully tested by A. NUSCH (Münch. med Woch., Dec. 23, 1902) who finds that the best effects are seen in uncompensated cardiac disease where the edema generally disappears in a few days. Very good results are also seen in pleurisy with effusion, while in parenchymatous nephritis the drug is contraindicated, since it does not act upon diseased renal epithelium. In interstitial nephritis, however, an increased diuresis may follow. The usual dose is three grams per day.

POST-DIPHTHERITIC OCULAR PARALYSIS.*

BY P. N. K. SCHWENK, M.D.,
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AMONG acute infectious diseases, diphtheria is the most common cause of paralysis of the ocular muscles. All the acute febrile diseases are accompanied by a post-latent stage, and in diphtheria this post-latent stage is characterized by the paralytic trouble so frequently met with after an acute attack of this affection.

Such paralysis is an essential part of the disease, due, in all probability, however, not to the disease itself, but to the presence in the system of certain resulting toxins. Some writers even assume that the paralysis should not be viewed as a sequel of diphtheria but rather as really a part and parcel of the disease.

If there is any affection which runs an indefinite course it is that of diphtheria, as one attack predisposes to another, differing in this respect from many other contagious diseases.

As a rule the paralysis first appears in the fauces, affecting deglutition and then successively involving the muscles of accommodation and those of the extremities. One of the main points to be depended upon is the fact that in diphtheritic paralysis only a comparatively small number of muscles are usually affected at the same time. Another point is the sphincter muscles are seldom or almost never involved in the paresis.

The ciliary muscles are more frequently involved as a sequence of diphtheria than any other portion of the muscular system, with the exception of the velum palati.

Donders was the first to discover the presence of paralysis of accommodation following diphtheria, when, in an epidemic of diphtheria in France, in 1860, he saw upward of thirty cases. Mention had already been made in a report by Fauré in 1857 of six cases, where paralysis of the palate, and of "weakness of sight," once too of strabismus. (Donders, p. 599.)

Bretonneau, Trousseau and Blanche have noted these post-diphtheritic paralyses, but attributed them to some disturbance of retinal function. Donders supposed the lesion to have been a hemorrhage in region of oculo-motor nerve centers, because in this way he could explain the "dulness in the head," slight attacks of vertigo, and the after-attacks of accompanied headaches. Paralysis of the pupil or *sphincter irides* is only an occasional accompaniment, yet Donders seems to have noted it more frequently than others. (Donders, p. 899.) Shelby†-Bush had observed one out of twenty-four cases of paralysis of accommodation following diphtheria.

In Graefe and Sämisch's Handbuch der gesammten Aguenheilkunde Foerster‡ fails to dedescribe a single case.

Diphtheritic paralysis is generally bilateral, although Jefferson§ reported one of unilateral para-

*Read before the Northwest Medical Society of Philadelphia, October 7, 1902.
†Archiv für Ophthalmologie, Bd. xvii., I. S. 265.
‡Bd. vii., S. 172.
§Medical Times and Gazette, 1873, Vol. XLVII, p. 89.

lysis of accommodation with mydriasis. The total hypermetropia existing after diphtheritic paralysis of accommodation, exceeds that that can be rendered manifest by any cycloplegiac after patient has recovered from the effects of the paralysis. This is accounted for by Jefferson in that the lens assumes a flatter curvature in prolonged paralysis of the ciliary muscles, than by a briefer paralysis induced by a cycloplegia.

The paralysis of accommodation manifests itself in from two to six weeks after an attack of diphtheria and generally passes off in about the same time.

It may be assumed that recovery from an attack of diphtheritic paralysis of accommodation is more rapid in the young than in those more advanced in years.

The presence of paralysis of accommodation is observed when the patient becomes convalescent in the inability to see near objects acutely, as reading, etc., together with or without double vision. Diplopia is observed whenever one or more of the extrinsic muscles are affected.

When the external muscles are affected, it is generally of short duration, excepting when the two internal recti muscles are involved recovery seems more retarded. The external rectus muscle seems peculiarly liable to be affected. Remak* found paresis of external rectus in ten out of one hundred post-diphtheritic ocular lesions. The paralysis bears no relation to severity of attack of diphtheria, as the lesion has been observed after the most insignificant attack. As to the seat or cause of the lesion, Donders described the angina in diphtheria to be a general disease, and that the altered blood-crasis excited a secondary morbid process in the central organ, which became the cause of the paralysis. The theory most generally accepted is that of Völcker,† who places the lesion in the nerve endings in the affected muscles. If it were in the trunk of the oculomotor nerve or in the short roots of the ciliary ganglion, the pupillary reaction would be lost and the external ocular muscles paralyzed. Since eserine produces the physiological effect on the ciliary muscle the diphtheritic poison cannot affect this muscle.

Buhl and Oertel's observations agree upon the same hypothesis that the cause of diphtheritic "paralysis in general is that the nerves are pressed on and constricted by the connective tissue proliferation, and recover their functions when the action of the injurious agent has ceased."

Knies‡ asserts that all the post diphtheritic lesions cannot be accounted for by the hypothesis of hemorrhages or inflammation in the nerves or their terminations in the muscles. He claims that some toxin is produced after diphtheria which has a direct influence on the muscles of accommodation.

Therefore it is impossible to account for the generally active pupils, the frequency of paresis rather than paralysis, and the bilateral character of the lesions on any other theory than the peripheral one.

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* Centralblatt für praktische Augenheilkunde, 1886, S. 161.
† Norris and Oliver's System of Diseases of the Eye, Vol. IV, p. 702.
‡ Transactions of the Ophthalmological Society of the United Kingdom, Vol. VI, p. 386.

POST-DIPHTHERITIC PARALYSIS AFFECTING THE GENERAL NERVOUS SYSTEM.*†

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CONTRARY to the view held by some, the frequency of paralysis is in direct proportion, I believe, to the severity of the general infection, although a severe form of palsy may follow a mild type of diphtheritic intoxication. The location of the membrane is of considerable importance as an etiological factor, diphtheria of the posterior nares especially predisposing to both local and widespread palsy. That age is an important factor is borne out by statistics. Gowers believes it to be relatively more frequent in adult life than in childhood. In statistics of other writers however, early childhood, from five to six years, seems to furnish the greater number of cases. The proportion of cases of diphtheria followed by paralysis is variously estimated from 10 to 30 per cent. In 1,316 cases of the disease reported by Myers, 275, or about 21 per cent., were followed by palsy.

Pathology.—Many of the older writers and some of to-day have regarded the palsy as a peripheral one only, due to polyneuritis. As early as 1863, Charcot and Vulpian published a paper as the result of their investigation, from which they drew conclusions similar to those generally accepted to-day. Pathological changes more or less constant have been found to exist not only in the peripheral nerves, but also in the nerve trunks and roots, in ganglia, and in the spinal cord and brain and their coverings. The muscles, too, share in degenerative changes secondary to and independent of nerve lesions, especially observed in the myocardium. There seems to be a unanimity of opinion as to the direct cause of the lesion, *i.e.*, a toxin elaborated within the body by the diphtheria bacilli or "by the body itself acting under the stimulus of these micro-organisms or their products" (Thomas). All agree likewise that the blood stream is the great carrier of the toxic substance although the selective power exercised in some instances, as when the palate alone is affected, accommodation paralyzed, etc., is hard to explain, unless proximity of the special structures involved renders them more vulnerable. The case of Kussmaul, which developed diphtheria of the navel soon after birth followed by paralysis of the abdominal muscles, in a measure confirms the view that proximity to the source of

* Read before the Northwest Medical Society of Philadelphia, October 7, 1902.
† For a complete bibliography, the reader is refered to Nothnagel's System of Practical Medicine, Vol. 3, English Edition. "Diphtheria," by Wm. P. Northrup, M.D.

infection may predispose the terminal nerve endings to invasion by the toxin.

Many of the earlier writers and some of to-day contend that paralysis is due to a peripheral nerve change of a parenchymatous nature and that little or no change is found in the cord and brain. Others maintain that the cells in the anterior horns of the cord are the primary seat of lesion, the peripheral nerve change being only secondary to the spinal lesions. A more conservative view and the one generally accepted, is that the entire neuron, either motor or sensory, may be the seat of pathological changes, the peripheral neuritis usually predominating and often existing without demonstrable change in the cord.

From a pathological study in 1896, Monicatide divided diphtheretic paralysis into four groups: "Those showing (1) purely muscular change without nerve involvment; (2) polyneuritis; (3) lesions of the spinal cord, which were either localized in the gray matter, leading to atrophy of muscles, or involved the white matter of the cord, in a similar way to that seen in locomotor ataxia or multiple sclerosis, and (4) cerebral hemorrhage chiefly due to circulatory change." This classification is accepted by many of to-day. To be scientifically correct, however, the fourth group, *i.e.*, the cerebral palsies, should not be classed as a palsy due to a diphtheritic toxin, inasmuch as it is accidental. Strictly speaking the term diphtheritic palsy should be applied to those palsies only which are due to direct action of the diphtheritic toxin.

Symptoms.—The blood stream being the main carrier of the toxins which gives rise to nerve and muscle degeneration, the entire nervous system may share to some extent in paralysis, although single nerves are frequently picked out by the poison as a seat of greatest intensity of action or as in some instances as the only seat of disease. During the second or third week of diphtheria, when convalescence is thoroughly established, instead of a gradual return to the normal, there is a slowly oncoming but progressive loss of strength, accompanied by wasting of the muscles of the extremities and, if the trunk is involved, of the thoracic muscles. In other cases the parents notice that after the child is up and around, to the regurgitation of liquids through the nose and the nasal twang of the voice, both of which began when the child was yet in bed, there is added a gradually increasing difficulty for the child to climb the stairs or even to walk. The gait becomes waddling and weak, causing the child to fall over the slightest obstruction in the way; at times too there is a decided stagger, really an ataxia. The hands and arms become weak and paralytic.

In a great number of hospital cases, seen for the first time by the physician, the paralysis is usually well advanced, accompanied by marked general emaciation. In the severer forms of paralysis the child soon becomes bedridden with inability perhaps to turn itself over in bed or to even raise the head from the pillow. The bladder and rectum sphincters may become paralyzed causing involuntary urination or constant dribbling and obstinate constipation. To paralysis of the extremities may be added paralysis of the respiratory muscles or of the heart, when the case becomes one of great gravity. The average case, however, does not lose power so completely and after from four to eight weeks of rational treatment, gradually recovers. Soon after the onset of the palsy, the knee-jerks are found to be diminished or lost, not only in the severer forms, when absence is the rule, but even in milder forms of paralysis. Its absence has been noted in at least 33 per cent. of all cases of diphtheria with or without paralysis in some form. Its absence, however, in mild cases is not observed until late in the disease as compared to severer forms, but its absence always indicates some change in the peripheral neuron. As a rule little if any pain is experienced by the patient and the nerve trunks are not painful when pressed upon. All degrees of severity are met with from a mild general paresis with slight emaciation, to the most complete palsy of all the muscles of the body associated with cardiac and respiratory paralysis. Symptoms of unusual gravity are paralysis of heart and respiratory muscles and of the muscles of the neck.

Instead of this general widespread palsy certain nerves may become the seat of great intensity of toxemia giving rise to special distinct forms of local paralysis. Four of these local palsies are of special interest as they occur alone or are part of a general palsy. Named in order of frequency they are palatal, ocular, cardiac and diaphragmatic. The ocular and palatal types rarely are a menace to life but deserve study in special papers. In 275 cases of diphtheritic paralysis, collected by Myers (*London Lancet*, Vol. 2, 1900), 110 were of the palate, 69 were cardiac and 21 were diaphragmatic.

The direct cause of cardiac failure in diphtheria has been much under discussion. The myocardial changes, however, are now thought to be secondary at least to functional disturbances of the vagi and probably due to organic changes in the nerve structure. Children from two to nine years are the most frequent sufferers; after the ninth year there seems to be a rapid decrease in the number of cases affected. The onset as a rule is early, about the seventh day of the disease, although the heart has been known to be affected as early as the second day and as late as the thirty-sixth.

The symptoms most characteristic of its onset, are irregularity of heart action, bradycardia, tachycardia, a lowering of the temperature, (frequently subnormal) and vomiting. Of these, bradycardia, vomiting and subnormal temperature have seemed to me to be most constant and are present early, especially in fatal cases. To these may be added gallop rhythm, dilatation of the heart, a short first sound with systolic murmur at apex, blueness of the lips and other mucous membranes and a coldness of the extremities, all indicating a profound cardiac dis-

turbance. Extreme restlessness I have noticed quite early and when accompanied by any of the above symptoms is quite characteristic. In 80 deaths collected by Myers 64, or 80 per cent., were due to cardiac paralysis. The duration of fatal cases is from two to fourteen days.

Diaphragmatic palsy may occur alone or be a part of a general paralysis. In the 275 cases of Myers, 21 were of this type; ten of the number recovered and eleven died, making 13.7 per cent. of the total deaths due to paralysis. Children between two and six years are the most frequent sufferers. The symptoms are dyspnea, retraction of upper abdomen during inspiration, weakness of voice and a tendency to the accumulation of mucus in the trachea and bronchial tubes. When the external respiratory muscles are also affected, respiration is almost impossible unless assisted.

The duration of fatal cases is from six to seven days. When the phrenic nerves alone are affected, the prognosis as a rule is more hopeful, since the external respiratory muscles are sufficient to keep up respiration until the phrenic nerve injury recovers. When, however, the weakness is very marked, tracheal obstruction by accumulation of mucus, or a secondary pneumonia may terminate the case.

Illustrative of this form of palsy is the case of Willie C., aged four years, who developed severe local symptoms of diphtheria and profound constitutional disturbance. He made a good, although tedious, recovery and at the time of my last visit, convalescence seemed to be thoroughly established. About three weeks later, in the sixth week of the sickness, I was sent for and found the following conditions: For about a week his mother noticed that the child was listless and refused to play but further than that noticed nothing unusual. Twenty-four hours before I saw him he seemed to have difficult breathing. Dyspnea gradually became worse, only possible with the greatest exertion, the child was semiconscious, breathing was shallow but noisy, much mucus having accumulated in the throat. With each inspiration the upper abdominal wall was retracted, the chest muscles were wasted in the extreme, the skin was ashy in hue and the lips blue. Death occurred a few moments after I arrived. Diagnosis, diphtheritic palsy of external and internal respiratory muscles.

Occasionally after an attack of diphtheria, individual muscles or groups of muscles, supplied by a single nerve or nerve trunk, have become paralyzed without general involvement. As a rule such localized palsies are followed by a more or less permanent injury to the part. Instances of this kind on record are, paralysis of the masseters, of the trapezii and of brachial monoplegia, a case of which was exhibited by the writer before the Philadelphia Pediatric Society last June. These paralyses are due usually to acute nuclear degeneration or to small capillary hemorrhages into the spinal cord.

Briefly, the history of the case of brachial monoplegia referred to, and which has never been published, is as follows: Robert B., aged two years, had a moderately severe attack of diphtheria, one sister suffering from it at the same time. Four thousand units of antitoxin were administered 36 hours after onset and he made a good recovery in about two weeks. At the end of the third week the mother noticed that he used the right arm but little and that it gradually became quite helpless and wasting became apparent. At no time during his illness had he had difficulty in swallowing either liquids or solids. His voice was perfectly normal and he gave no evidences of weakness in other parts of the body. He enjoyed good health up to the time of his attack of diphtheria. April 2, when he was admitted to my clinic at St. Christopher's Hospital, his condition was as follows: He was plump and hearty in appearance, quite a muscular little fellow with rosy cheeks and pink mucous membranes. He was perfectly normal in his development and his trouble is confined to the right arm and hand, which hangs limply by his side and is rarely used. The muscles of the arm, forearm and hand are wasted; the wasting being more marked in the hand and forearm. The dorsal interossei are all wasted, the first most markedly so and the thenar and hypothenar eminences are flabby and flattened. At rest the proximal phalangeal joints are extended and the distal ones are flexed. There is unilateral wrist drop, supination is weak and the grip is entirely absent. Flexion at the elbow is possible but not when resisted and elevation of the shoulder is also feebly accomplished. The knee-jerks are erratic, never absent but usually exaggerated, not spastic. The biceps tendon jerks are not obtainable. In other respects examination revealed nothing abnormal. Reactions to the faradic and galvanic currents were slightly altered quantitatively. After a month's massage, the condition improved very much. The arm was useful, wasting was confined mostly to the small muscles of the hand and it became possible for the child to grasp and hold objects in his right hand. At this time recovery is complete in the upper arm and forearm, but the wasting in the hand persists, the thumb being in the position of abduction, and the distal phalangeal joints are flexed.

The diagnosis of post-diphtheritic paralysis due to disease of the cells in the anterior horns of the cord is based on the following points: It occurred at the time usual for the diphtheric toxin to manifest itself on the nervous system, the deep reflexes were absent only in the arms, its onset was more gradual than a polyneuritis, wasting was rapid and sharply localized, recovery under treatment was prompt except in the hand in which marked wasting persists. Injury, rickets, and cerebral palsy are easily excluded.

Finally there is a form of paralysis occasionally met with after diphtheria, as also after other infectious diseases, in which the brain alone is involved—a hemiplegia, not unlike the hemiplegia which occurs in the adult. The pathological lesion is a thrombosis, an embolism or a ruptured

blood vessel, within the brain, usually in the internal capsule. The symptoms and after history differ in no respect from hemiplegia of adult life with which we are familiar.

The following case is typically illustrative of this form of palsy: Horace B., five years of age, had whooping cough and measles when two and a half years old, but otherwise was well until January, 1902, when he had an attack of diphtheria in which there was marked glandular involvement. The infection was severe and persisted longer than the same disease in his sister, who was similarly afflicted. On the eleventh day of the disease he suddenly became unconscious and had a convulsive seizure, consciousness returning only after twenty hours. After regaining consciousness he understood what was said to him, but could not talk, could not use right arm and leg, and his face was drawn to the left. In three weeks he could say mamma and words have been slowly returning. He was able to walk some after ten weeks. His condition at present is as follows: He is of average size and well developed. He has a semi-flaccid palsy of right arm and leg and walks with a typical hemiplegic gait. All reflexes are much increased, but ankle clonus is not present. Passively the leg and arm can be moved at will without any appreciable resistance. At rest the face is straight, but during strong emotion it is drawn strongly to the right. Tongue protrudes straight. There is some motor aphasia, but the patient now talks fairly well. The heart sounds are negative and the kidneys show no signs of disease. During sleep athetosis is present. About six months after the onset of the palsy the child had another convulsion and several have followed since. The diagnosis is clearly hemiplegia of cerebral origin, diphtheria being the direct exciting cause. The pathological lesion, however, in this case is not a degeneration of nerve tissue primarily, but a vascular lesion, most probably a ruptured blood-vessel.

You will observe that this form of palsy differs materially in its pathology from the other forms cited and should not, therefore, be regarded as a diphtheritic paralysis. It should be regarded as purely accidental. Influenza, typhoid fever, scarlet fever and measles may in a similar manner be followed by a like condition. In matter of time, too, the palsy develops as a rule at the height of the infection rather than during convalescence.

As a sequence to multiple capillary hemorrhages occasionally within the cord and brain, symptoms of multiple sclerosis have been served in a few cases and at necropsy, microscopical changes similar to those of true multiple sclerosis have been observed.

Diagnosis.—Given the history of a preceding attack of diphtheria, diagnosis of the palsy offers little difficulty. Without this history, however, it may become difficult to determine the cause of the paralysis. The disease with which it is most apt to be confounded is acute anterior poliomyelitis. In severe or widespread destruction of the polar cells in the latter disease, the distribution of the palsy may be similar to diphtheritic paralysis. The onset, however, is more sudden and usually preceded by fever. Wasting also in the spinal palsy is apt to be localized rather than general, and certain groups of muscles, as for instance the extensors of arm and anterior tibial group in the leg, are apt to be the seat of wasting. In diphtheritic paralysis the wasting is general except in those patients in whom small areas in the cord are the seat of disease, when the previous history will help to decide.

From a pseudo-rachitic palsy it may be distinguished by the absence of evidences of rickets and the usual paraplegic type of a rachitic palsy.

The question as to which part of the neuron is diseased probably offers greater difficulty than the cause of the palsy. Lesions of the cells in the anterior horns as a rule are small so that the palsy is limited to a single group of muscles or even to a single muscle and the damage is more or less permanent. When the peripheral nerves are affected the distribution of the palsy is usually general and the paralyzed parts tend to recover rather rapidly and completely.

The cerebral type of palsy is distinguished by the fact that it usually is preceded by a convulsion, the palsy is hemiplegic, spastic with increased reflexes and may or may not be accompanied by asphasia. It usually occurs during the height of the febrile attack.

Prognosis.—The prognosis in general is good. Even severe general palsy tends to recover under appropriate treatment, when not complicated by cardiac or diaphragmatic paralysis. Of the 275 cases reported by Myers, 80, or about 29 per cent., died. Sixty-four of the 80 deaths were due to cardiac failure and 11 to diaphragmatic paralysis, leaving but five due to a general paralysis. When cardiac failure develops either alone or associated with a general palsy, death is almost invariably the rule. The same may be said of respiratory paralysis when both diaphragm and external respiratory muscles are involved. Lesions of ganglia and spinal cord are followed by symptoms more or less permanent, although the patient's life is rarely in danger. As in adult life, the prognosis of cerebral hemiplegia is uncertain, depending upon the location and extent of the lesion. Complete recovery, however, rarely obtains. In any of the above forms of paralysis, if recovery is not complete, contractures may take place, which in turn may cause organic shortening and permanent contraction of certain muscles.

Treatment.—Treatment of diphtheritic paralysis is of unusual interest. Fortunately we have at our disposal the means of prevention in many cases or at least of modifying the severity of the palsy. Rainy conducted a series of experiments upon guinea-pigs with diphtheritic toxin and antitoxin. By these experiments he found that by injecting a large dose of antitoxin into the animal an injection of the diphtheritic toxin in excessive doses was not followed by paralysis, although in the control experiment in which the antitoxin was not used, the animal invariably developed paraly-

sis. Not to go into detail, his conclusions in substance were that in the guinea-pig at least antitoxin was an absolute protection against paralysis when administered in sufficiently large doses soon after the introduction of the toxin.

These experiments and the experience and statistics of others furnish us with undoubted proof of the assertion that much may be done to prevent and mitigate this menace to childhood. Aside from the use of antitoxin as a prophylactic against paralysis, it is doubtful whether we have not been too slow in grasping this means offered us for combating the primary disease early in its course.

As the early administration is of paramount importance for the successful recovery of the patient from diphtheria, so it is of greatest importance to eradicate from the system, or probably rather to prevent the formation within the system of toxins which act so destructively upon the nervous system. This confidence in the serum as a means of preventing paralysis, has been expressed by most writers of to-day, and the view seems to be especially warranted by facts. The extensive use of the serum has, however, lowered the mortality rate of diphtheria very considerably without at the same time diminishing the proportion of cases which are followed by paralysis and this may seem to detract from our argument. The explanation, however, is simple. Our mortality rates are materially lowered, from which we can conclude that many severe cases are restored to health, perhaps only after protracted illness and profound infection. And it is not unreasonable to conclude that these severe cases restored to health, which under former methods of treatment would probably die, are more frequently followed by paralysis than the mild cases in which the toxin has been eradicated very early.

A second means of prevention and one which ordinarily should be mentioned first, but which I prefer to place second to serum, in order to emphasize the latter, is absolute rest. Of the more serious forms of paralysis, the heart and diaphragm suffer out of proportion to the rest of the body and the reason is apparent. The muscular system in general is placed at rest at least during the acute stage of the primary disease, whereas the heart and diaphragm are in a constant state of activity and in fact are doing a greater amount of work than in health. Parts functionally at rest are better prepared to withstand the action of toxins, especially when their nutrition is directly affected by the poison.

Absolute rest is undoubtedly imperative, not only during the acute stage of diphtheria, but for some days after the external evidences of the disease have disappeared. Since the introduction of the serum this precaution is especially important. The duration of the acute febrile attack has been shortened to four or five days in the majority of instances, in contrast to the former average duration of fifteen days, and the tendency to accede to the will of patients and parents in allowing patients up too soon, I believe to be responsible for a not inconsiderable number of cases of paralysis.

What is true of rest as a prophylactic measure in the acute stage of the disease is doubly true of it as a curative agent after paralysis has made its appearance. As a preventive measure it ranks equally with serum, but as a curative agent it easily takes first place in our armamentarium, not only in severe heart cases, but also in mild cases of paresis. The patient should be placed absolutely at rest in bed and be given a nutritious diet. In a majority of cases improvement will follow these measures alone. Of great assistance in hastening recovery are massage and galvanism.

Among the drugs of value to be administered internally, iron and strychnine in liberal doses are probably the most satisfactory.

In severe cardiac paralysis, with bradycardia, vomiting and subnormal temperature, little can be done but support the heart by hypodermics of strychnine and supply heat to the body. Cardiac stimulants are contraindicated. Stimulation of an overworked, degenerated heart muscle will accomplish nothing but harm.

In respiratory paralysis, artificial respiration has been known to save life.

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POST-DIPHTHERITIC PARALYSIS AFFECTING THE EAR AND THROAT.*

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THERE are three factors which may be considered as the direct cause of post-diphtheritic paralysis. These are: The bacilli, their poisonous product, the toxin, and a by-product—probably making no attack upon the general system, but limiting its action to nerve tissue—which is called the "toxone." This last cause is recognized by Mr. Dundas Grant[1] as possibly fully explaining the rather frequent occurrence of post-diphtheritic paralysis in mild diphtheria cases treated by antitoxin. The toxin is most generally accepted as the cause. In a few cases, however, there seems to be clear evidence that the bacilli hold that relation.

The pathological picture may be varied. A degeneration of the muscle fiber has been produced in experiments by Mollard and Regaud[2] by the injection of toxin. Instead of this the dominant lesion may be a parenchymatous degeneration of the nerve, or the central nervous system may be primarily diseased. Each case will fall then under one of these three heads: (1) Muscular degeneration; (2) localized neuritis and degeneration; (3) central nerve destruction or degeneration.

The most frequent site of the paralysis is the pharynx. Myers asserts that 40 per cent. of the post-diphtheritic palsies are confined to the palate and that in 12 per cent. the palate and eye muscles are affected. The larynx may be the only

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part involved or it may be in conjunction with other parts, near or distant. The muscles of mastication are very rarely implicated. Grant[3] reports a case of post-diphtheritic paralysis of the external pterygoids and other muscles of mastication which lasted fourteen months, with no impairment of taste, hearing or vision, but at the outset with a disturbance of speech and regurgitation through the nose when drinking. The sense of taste and smell are also very rarely impaired.

The organ of hearing may suffer and deafness result. This must be extremely rare, for according to Gowers hearing is never impaired. I have been able to find two cases of deafness resulting from diphtheria, both bilateral. J. C. Wilson[4] reported one in 1897, occurring in a woman of thirty-three years, which persisted seven months later. H. H. Tooth[5] reported the other case in 1893, which I quote in abridged form: "Boy of five. Membrane on tonsil and in nose. Urine albuminous. One month after beginning of attack became suddenly deaf and giddy, with palate paralyzed and knee-jerks absent. In three weeks palate recovered and patient began to hear loud shouts. Four days later could hear watch one inch from right ear, but not in the left. Perosseous deafness was absolute and walking with the eyes shut impossible. Three weeks later hearing in right ear normal and the watch at six inches in the left, and in yet another three days tympanic and perosseous hearing were normal. Knee-jerks absent and he tended to fall on walking down a line. Eustachian obstruction would not account for total deafness, which occurred after all diphtheritic inflammation had vanished. Dr. Tooth's conclusion was that the auditory nerve or center (he favored the latter) had been implicated in the same way as in ordinary diphtheritic paralysis.

The location of the membrane has little if anything to do with determining the subsequent distribution of nerve or muscle degeneration. Diphtheria of the nares with very little constitutional disturbance has been followed by a remote paralysis. On the other hand a unilateral paralysis of the palatal muscles may be limited to the part immediately covered by the pseudo-membrane, and in such a case it is fair to infer that the pathological condition is a myositis rather than a nerve change.

The time of onset has been given by Woodhead,[6] based on a study of 7,832 cases of diphtheria—1,362 of post-diphtheria paralysis—as from the fifth to the fifty-fifth day of the disease for the palate, fourth to the seventeenth for the ocular-motor muscles, the heart usually from the fifth to tenth day, and other parts—primary paralyses—from the tenth to the fourteenth.

The duration of these palsies may be from a few days to weeks or months, and rarely, may never be recovered from. At present I have under my care a child of twelve with a paralysis affecting the larynx, of nearly a year's standing, during which time no treatment has been given. Wilson's case of bilateral deafness persisted seven months after the attack of diphtheria. On the other hand, in Tooth's patient with bilateral deafness, the hearing was perfectly restored in about seven weeks.

The restoration of function undoubtedly depends first upon the nature and extent of damage done, and secondly, when the damage is reparable, upon the treatment and care of the case.

That there may be a mortality record in paralyses of this region is evidenced by the death of a man whose symptoms were slight impairment of tactile sensation, regurgitation of food through the nose, and unilateral paralysis of the palate. While drinking tea he began to cough. This ceased in a few minutes and he became distressed in breathing, simulating closely an attack of asthma. At no time was there evidence of laryngeal obstruction. He died in less than ten minutes. At the necropsy one and a half ounces of tea was found in the bronchial tubes. Hale White,[7] who reports this case, gives the cause of death as "spasm of the bronchial tubes."

The treatment of post-diphtheritic paralyses may be considered as preventive and curative.

It is now generally conceded, in spite of seeming testimony to the contrary, that antitoxin prevents and never causes paralysis. The greater number of profoundly poisoned patients who have recovered through the use of this serum, has added to the number of candidates for paralysis by saving their lives after the toxin has started nerve and muscle degeneration. Experiments on the lower animals have proven irrefutably that when the antitoxin follows close upon the introduction of the toxin and in a sufficiently large dosage, the chemic neutralization eliminates the opportunity for action upon nerve or muscle cells. If the injection of the antidote is delayed, the toxin has attacked the cells of the organism and only that part is neutralized which is free in the system.

Sir Thos. Barlow has recently spoken of antitoxin as "a fundamental remedy of enormous potency," and it has added the credit for preventing paralysis, which many denied it for a long time, to its reputation for saving life. But here even more emphasis upon the time and dosage should be laid than when it is given to save life. The ideal way to use antitoxin is to inject it at the time the disease is acquired and in sufficient amount to completely neutralize the toxin. The nearer we come to this ideal the more lives we will save and the fewer post-diphtheritic paralyses we will see. We must bear in mind the possibility that streptococcic infection so frequently found with diphtheria may cause paralysis—as other infectious diseases, such as influenza and typhoid fever, rarely do—and would not be prevented by even the early injection of diphtheria antitoxin.

The local use of antiseptics I do not believe is needed with this better treatment at hand. Rest in bed, nutritious and easily assimilable diet, the perfect action of the skin, kidneys and bowels,—

all tend to lessen the severity of the paralysis. They are certainly fundamental principles of the treatment when paralysis has occurred. Strychnine should be administered throughout the course of the disease, and is the most useful drug at our command to restore impaired function. Electricity, tonic baths and general massage, by the general toning up of the whole body, are valuable adjuncts.

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LABORATORY AIDS IN THE DIAGNOSIS OF TYPHOID FEVER.*

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LABORATORY examinations are of aid to the clinician in many cases of typhoid in which the clinical symptoms leave some degree of doubt as to the diagnosis. There are three purposes which the corresponding laboratory tests have in view: (1) the detection of characteristic morbid products of the disease; (2) the isolation and identification of the infecting organism; (3) the detection of certain cell products, the agglutinins, or one of the constituents, the presence of which is induced by the infecting organism.

The detection of morbid products more or less characteristic of typhoid is practically limited to the test for the unidentified substance which gives the diazo reaction of Ehrlich. Its value as an aid in diagnosis is variously estimated by different observers. That given it in the bacteriological laboratories of the New York Health Department is perhaps the most favorable to the test of any opinion of which I know. Their circular states: "The diazo reaction is present in over 90 per cent. of all cases of typhoid fever, appearing from the third to the sixth day, thus antedating the appearance of the Widal reaction in the blood. The reaction is very occasionally present in certain other conditions: these are severe scarlet fever and measles, acute miliary tuberculosis and general carcinosis. If these be eliminated, the reaction almost certainly indicates the existence of typhoid infection." This statement is not based on the results of the public use of the test, so that it is fair to presume that it is more or less tentative.

As an example of a less favorable opinion, I may mention a recent statement of Syers, based on a limited number of observations, that the test is of very little value. My own experience with its routine use, not in selected cases, is that its occurrence is distinctly less frequent than in 90 per cent. of typhoids, particularly so if we limit the observations to the period from the third to the sixth day. Johnson recently reports a positive reaction in 80.5 per cent. of 728 cases examined at all periods of the disease, obtaining the reaction as well in 46 per cent. of 309 cases of pulmonary tuberculosis, 18.9 per cent. of 90 cases of pneumonia, 26.2 per cent. of 42 cases of malaria and 23.9 per cent. of 46 cases of erysipelas. Other observers report the diazo reaction positive in cases of paratyphoid infection.

It is probable that the various conclusions of different observers regarding the value of the Ehrlich test are to some extent explained by the different standards adopted, as to what constitutes a positive reaction. In connection with the technic I may mention, too, that the urine should be tested before the addition of any preservative. On the whole, it seems apparent that the test has considerable value, but that quite a number of other conditions of disease must be excluded and that its failure to appear does not exclude the possibility of typhoid infection. It is without doubt well worth observing, but is not to be given greater weight than any other single symptom which is not pathognomonic and which may be wanting altogether.

The isolation of the infecting organism is of clinical value only when it can be expeditiously accomplished. The use of special media directed to this end enables the experienced observer to identify the organism with sufficient accuracy in many cases in 48 to 72 hours. The materials examined are the rose spots, the blood, the feces and the urine.

The examination of the rose spots may be of value, but as a routine procedure has been found open to the following objections (Krause): (1) The eruption does not appear in all cases or does not appear early enough to yield the information desired; (2) that it is not possible to isolate the organism from every spot; (3) that it is not always possible to distinguish the spots from eruptions not due to the illness in question.

To this I may add the inconvenience of taking the specimen in private practice. This same objection applies to the isolation of the bacillus from the blood. It is only occasionally, and usually in hospital cases, that it is expedient to practise puncture of the spleen or the removal of sufficient blood at any point for the inoculation of cultures. Besides this is the failure to obtain the organism from the blood in a considerable number of cases. Failure to find the organism applies to examinations of the feces and urine for typhoid bacilli and for this reason leaves much to be desired in many cases, but here the absence of inconvenience in obtaining the specimens and the absence of necessity for the laboratory specialist to visit the case renders the procedure worthy of more general application than it at present receives. When the bacteriological diagnosis is positive it is pathognomonic, but there are many cases in which the organism cannot be identified at a time to assist in the diagnosis.

We are all agreed, I think, that the value of ag-

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glutination reactions by the serum is now demonstrated beyond question. Misleading results have come from faulty laboratory technic, but with our better acquaintance with these reactions, faults in technic should be eliminated. A positive Widal reaction in the hands of a competent observer must now be given great weight in establishing the diagnosis of typhoid, certainly as much as other symptoms of first importance.

It is in the absence of a positive Widal that clinicians now find the greatest defect in this laboratory aid. The reaction frequently appears by the sixth day, usually by the eighth, but in exceptional cases not till the fourth or even the fifth week of the disease. The absence of other blood findings will assist in excluding other causes of fever and will indicate the advisability of repeating the Widal test, but it is well to remember also that the presence of other causes of fever does not exclude the possibility of typhoid which may manifest itself by a late Widal.

Studies of the bacteriology of cases with typhoidal symptoms, which do not give the Widal test, have shown that the infecting agent in these cases may differ culturally from the *Bacillus typhosus*, resembling more or less the colon bacillus. These intermediates have been called paratyphoids. Buxton recognizes two species of this group: (1) a distinct species culturally unlike the paracolons; (2) a distinct species culturally resembling the paracolons. The clinical pathologist has resource, therefore, to at least two additional agglutination tests in negative Widal cases, namely, the serum reactions with each of the species distinguished by Buxton. It must be remembered that it is not to be expected that this will lead to an early diagnosis in those cases of infection with *Bacillus typhosus* in which there is a late appearance of the Widal reaction, but that it will render a diagnosis possible in those typhoid-like cases with a negative Widal which are now known to be induced by infection with the paratyphoids. As recently emphasized by Coleman, the clinical natures of these two infections, namely, *Bacillus typhosus* and paratyphoid, are identical; since, too, the sera from cases of infection with these closely related bacteria tend to interact in low dilution, the reaction should be obtained in dilution of at least 1 to 40 in order to prevent confusion.

In conclusion, while the laboratory does not offer any one aid in diagnosis that is certain at all times in all cases, it does materially aid the clinician by the means mentioned, at times strengthening an early suspicion in cases that later present the classical symptoms and in some instances enabling him to identify atypical cases that without its aid would escape recognition.

I cannot close this enumeration of laboratory aids without calling attention to the instances where the laboratory is of service in establishing the diagnosis of some other conditions of disease where typhoid is suspected. Thus the recognition of the parasites of malaria; of the high polynuclear leucocytosis without eosinophiles and with increased fibrin formation and greatly diminished urinary chlorides of pneumonia; of the infecting organism of tuberculosis; of the relative lymphocytosis and marked protoplasmic degeneration of the red-blood cells in some forms of intoxication, the recognition of these or other findings are illustrations of the point in question.

Finally, I call attention to the subject under discussion and emphasize again that in the majority of instances the laboratory aids the clinician, leaving the final diagnosis for the judgment that takes into consideration both the clinical picture and the laboratory findings.

THE INFLUENCE OF SODIUM CHLORIDE UPON GASTRIC SECRETION.*

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No sooner were the modern theories of electrolytic dissociation and osmotic pressure accepted by physical chemists than their applications to physiology were recognized and enthusiastically studied. Thus Loeb[1] examined the action of certain electrolytes upon the frog's muscle. Bugarszky and Tangyl[2] determined the concentration of the dissociated substances in blood serum and the relation between the electrolytes and non-electrolytes contained in it. Dreser[3] calculated the work done by the kidneys in secreting urine. Other investigations along similar lines were carried out by Hamburger,[4] Hedin,[5] Heidenhain,[6] von Korányi[7] and von Limbeck.[8]

Following these came Koeppe's[9] hypothesis regarding the formation of hydrochloric acid in the stomach. His theory assumes a breaking down of H_2O into H and OH, the H cations uniting with the Cl anions of the dissociated NaCl thus forming HCl, while the Na cations of the dissociated NaCl and the OH anions of the dissociated H_2O on account of the osmotic peculiarities of the stomach membranes pass out to form NaOH and thus contribute one of the alkaline components of the blood; and a breaking down of the H_2CO_3, $NaHCO_3$ and NaH_2PO_4 of the blood into $H+H+CO_3$, $Na+H+CO_3$ and $Na+H+H+PO_4$, the H cations on account of the osmotic peculiarities of the stomach membranes pass into the stomach to unite with the Cl anions of the dissociated NaCl to form HCl, while the Na cations of the dissociated NaCl pass out to unite with the CO_3 and PO_4 anions of the dissociated H_2CO_3, $NaHCO_3$ and NaH_2PO_4, and thus contribute some of the alkaline constituents of the blood.

We have here a well-elaborated hypothesis which is apparently not inconsistent with any of the laws of dissociation or osmosis. In his original paper Koeppe offers no experimental proof of his theory. Nor was any attempt made afterward, to the writer's knowledge, to test this hypothesis until 1899. In that year Wesener[10] published

*From the Sheffield Laboratory of Physiological Chemistry, Yale University.

an experimental investigation of Koeppe's theory. He introduced saline solution into a thoroughly washed stomach and after ten minutes withdrew the gastric contents. No HCl was found. Wesener then introduced more saline solution and inserted Turck's "gyromele," which he rotated to irritate the mucous membrane. Upon examining the gastric contents ten minutes later 0.1 per cent. HCl was found. From these results Wesener concluded that Koeppe's theory is untenable.

Wesener's experiment does not in itself warrant his conclusion. Pawlow[11] has shown that *mechanical* irritation of the mucosa does not produce a true gastric secretion. At present it is generally believed that only psychical and chemical stimuli call forth a true gastric secretion. In this light neither the isotonic salt solution nor Turck's "gyromele" are gastric secretory stimulants, and therefore his results obtained under abnormal conditions do not fairly test the tenability of Koeppe's theory.

To test the tenability of Koeppe's theory the gastric secretion ought to be called forth under normal conditions—or, in other words, by food. In the writer's experiments, carried out upon himself, varying quantities of NaCl were taken with an ordinary test meal and after a definite period of time the gastric contents were removed and the acidity determined by the Toepfer-Freund[12] method.

In experiments XV and XVIII quantities of lactose, a non-electrolyte, and sodium sulphate, an electrolyte, respectively, were taken for comparison, in quantities, approximately equi-osmotic with the amount of sodium chloride found to produce a marked inhibition of hydrochloric secretion.

The results are summarized in the following table:

TABLE OF RESULTS.

No. of Experiment.	Date of Experiment.	Nature of food.	Time between meal and withdrawal of stomach contents.	Total acidity as HCl Per cent.	Free HCl. Per cent.	Combined acid. (as HCl) Per cent.
I	2-8	Riegel test meal	2½ hrs.	.288	.151	.048
II	2-11	Ewald meal	1 hour	.222	.151	.030
III	2-12	Ewald meal	1 hour	.255	.153	.051
IV	2 14	Ewald meal	1 hour	.251	.156	.040
V	2-16	Ewald + 1 grm. NaCl.	1 hour	.190	.110	.036
VI	2-18	Ewald + 2 gms. NaCl.	1 hour	.180	.107	.034
VII	2-19	Ewald + 3 gms. NaCl.	1 hour	.110	.054	.029
VIII	2-20	Ewald + 5 gms. NaCl.	1 hour	.091	.040	.032
IX	2-21	Ewald test meal	1 hour	.180	.110	.040
X	2-22	Ewald + 5 gms. NaCl.	1 hour	.054	.....	.043
XI	2-23	Ewald + 5 gms. NaCl.	1 hour	.051	.....	.022
XII	2-25	Ewald + 5 gms. NaCl.	1 hour	.065	.018	.021
XIII	2-26	Ewald T. M.	1 hour	.120	.080	.036
XIV	2-27	Ewald T. M.	1 hour	.135	.087	.022
XV	2-28	Ewald + 30 gms. lactose	1 hour	.170	.090	.040
XVI	3-2	Ewald + 5 gms. NaCl.	1 hour	.075	.....	.060
XVII	3-3	Ewald T. M.	1 hour	.180	.110	.040
XVIII	3-4	Ewald + 6 gms. Na_2SO_4	1 hour	.166	.085	.042

From the above experiments the following conclusions seem to be justified:

(1) Excessive quantities of NaCl apparently exert an inhibitory influence on HCl secretion and thereby may impede gastric digestion. (This is in harmony with Miller's[13] observations.)

(2) The ingested NaCl is apparently not directly converted into HCl in the stomach to the extent—if at all—which one might theoretically expect, assuming the theories of Koeppe and Brasch[14] to be tenable.

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MEDICAL PROGRESS.

NEUROLOGY AND PSYCHIATRY.

The Etiology and Classification of General Paralysis.—Contrary to the opinions of many prominent neurologists, MORSELÉS (Rev. di Freniatria, Vol. XXVIII, fasc. 1) considers syphilis as the etiological factor in hardly 60 per cent. of the cases of general paralysis, which he defines as a distrophic disease of the nervous system resulting probably from intoxication. The abuse of alcoholic drinks, grave psychopathic hereditary tendencies, sexual excesses and arthritism all play at least as important a rôle in the genesis of the affection as does syphilis. In the majority of cases it is the combination of these factors that constitutes the cause of the disease; and even if there be one single cause, psychopathic heredity is of greater importance than syphilis alone; thus prostitutes, even though thoroughly syphilized, present a comparatively small contingent of general paralytics as compared with married women, whether syphilitic or not. With the exception of rare cases the disease usually develops from between 10 and 25 years after the initial infection, even when the patients had repeatedly subjected themselves to antisyphilitic treatment. Arthritism the author considers to be even a more frequent cause of the disease than syphilis, especially among the wealthier classes of people, where he encountered two-thirds of his cases with and without syphilis. These cases are of renal character and are frequently ushered in with epileptic or apoplectic attacks of uremic origin. This type of the disease is frequently unaccompanied by syphilis. Race, climate and general surroundings are all important factors in the genesis of general paralysis; thus the disease is very rare among Arabs and Abyssinians, among whom syphilis in its serious forms is quite frequent; nor is it encountered to any great extent among the Swedes and Norwegians, who are pronounced drinkers. Poor nourishment is not an infrequent cause, as observed among the poorer population of Italy. In a great number of autopsies performed by a very efficient pathologist, specific syphilitic lesions were found but

once; while the changes found in the arteries and kidneys do not differ from those encountered in non-paralytic arthritis, apoplexy and alcoholism. The non-syphilitic origin of the disease is substantiated by the fact that syphilis does not appear as the constant causative factor, and other etiological agents produce the same clinical syndromes and pathological lesions. The relation between general paralysis and its etiology is illustrated by the well-known fact, that various pathogenic agents are apt to induce an identical anatomo-pathological process; thus similarly to general paralysis, epilepsy may be of syphilitic, traumatic, alcoholic, arthritic or hereditary origin. The fatalism of the Arab and the laziness of the Abyssinian are the real causes of the rarity of progressive paralysis in these races notwithstanding the frequency of syphilis among them; but as soon as European modes of living are introduced among them they rapidly fall under the sinister influence of the disease. The clinical picture of paralysis is protean in its manifestations: At the beginning, it may assume the form of melancholia, or mania, or epilepsy, or paranoia, etc., and even during its further course variable symptoms may appear occasionally. But from the very commencement the mental decadence becomes apparent, and sooner or later somatic symptoms follow. Tabes dorsalis may well be named the preface (the author calls it antechamber) to general paralysis. The abolition of patellar reflexes and the appearance of impotence are grave symptoms which may precede the full development of the affection in six or seven years, the remarkable remissions often show a return of the individual to his former personal integrity, and this fact is of immense importance as regards the question of his legal responsibility.

Contributions to the Knowledge of Hereditary Diseases.—Heredity is quite a specific cause of disease, according to E. JENDRASSIK (Deut. Zeitschr. f. Nervenheilk., Nov. 27, 1902) it produces certain forms of disease that can not be produced by other causes. It is not correct to accept a case as hereditary disease only when several members in a family are attacked by it; isolated cases often occur, and in families badly afflicted, even in the worst families, exceptions frequently occur. Indeed, these apparently healthy members transmit the disease to their descendants. The hereditary forms of disease, do not develop in quite typical, sharply circumscribed clinical pictures; on the contrary, the symptoms vary in endless combinations. For practical purposes specific types may be considered; nevertheless they should not be held different disease entities. The hereditary diseases may attack particular elements of the body, *e.g.*, the nervous system, the muscles (dystrophies), the connective tissue (obesity, wasting), the bones (achondroplasia, osteodystrophy), the separate organs, etc. In some cases only the disposition to various exogenous diseases is inherited; in others, direct aplasias, hyperplasias, atrophies and degenerations. The symptoms of a hereditary disease can display in the same family few or many differences, yet the clinical picture in general remains faithfully preserved. Peculiar, anomalous grouping of otherwise hardly associated symptoms in chronic, slow, progressive development would point with greatest probability to a hereditary degeneration. Consanguinity of parents increases in the greatest degree the possibility of the appearance of hereditary degeneration.

Tabes Dorsalis and Aortitis.—The opportunity has been afforded to P. F. ARULANI (Rif. Med., Nov. 6 and 7, 1902) to study 68 tabetic cases, and from this experience together with the observations of other clinicians, he concludes that aortitis is a frequent accompaniment of tabes dorsalis; and with the former a relative insufficiency is often associated. The characteristic diastolic murmur may not be recognized unless the patient be examined immediately after exercising when the dilation of the aorta, brought about by the exertion, causes accentuation of the sound. The occurrence of aortic aneurism in tabetics may, in the author's belief, be attributed to the predisposing aortitis. Arulani holds it probable that the same toxic influences which give rise to tabes, such as alcoholism, syphilis, etc., may likewise be responsible for the accompanying aortitis, insufficiency and aneurism; and presents a description of two cases in which variola seemed to be the causative agent. However, he suggests that the nervous lesion may give rise to the vascular lesion or perhaps intensify it.

Operative Interference in Epilepsy.—There is probably no disease for which so many operative procedures have been recommended. R. E. DORAN (Albany Med. Ann., Dec., 1902), of the Craig Colony, classifies these operations under three headings: (1) Those undertaken with the intention of removing sources of irritation in the brain; (2) those done on the theory that the diseases is caused by some abnormality of intra-cranial pressure or circulation; (3) those promoted by a belief in the reflex origin of epilepsy. The first group includes operations for the removal of traumatic or diseased conditions from the brain cortex. The second includes tapping and drainage of the cerebral ventricles, ligature of one or both vertebral arteries or veins, and of the carotid. The third includes a great variety, such as cutting of eye-muscles, removal of nasal and pharyngeal growths, division of the cervical sympathetic, stretching the pneumogastric, excision of cicatrices, circumcision, castration, hysterectomy, etc. Although many of these procedures have been discarded, they should not be entirely condemned. Reflex epilepsy is rare, yet all possible sources of reflex irritation should be sought for and all necesary operations done, giving the patient the benefit of the doubt. Although many operations have been done at the Craig Colony, the results have not altogether been satisfactory. The experience of recent years has done much to fix the limits of operative interference. The author reports 29 cases of trephining, 24 prior to and five after admission. Traumatism to the head was known in 17 cases, the others gave no traumatic history. Of all these, six were improved, 19 were unimproved, two were in doubt, and two were worse after the operation. None were cured, though in certain cases the attacks were lessened. Of five cases re-operated at the Colony, none were cured, though a benefit was noted in two. Medical treatment may have influenced the latter. The results of late operations therefore are discouraging and the author advocates early operation after traumatism to the skull, with the hope of averting the disease. Operative cases must be selected with great care and studied from both medical and surgical standpoints. Partial epilepsy is not an absolute indication and heredity must always be considered, also the question of alcoholism. Oophorectomy has often been recommended and the author thinks it is justifiable in certain cases when other measures have failed, especially when the patient becomes worse mentally, morally and physically, when erotic tendencies are present, when the attacks are worse at the menstrual periods, or when there is ovarian disease present which would indicate operation in a non-epileptic patient. Four cases are reported with apparent improvement but at least three years ought to elapse with freedom from attacks before a cure should be reported. Too much dependence should not in any case be placed on the operation itself. The general health and diet should be regulated, and bro-

mides given if they cause any benefit. Alcohol should be prohibited and an outdoor employment advocated. Indulgence in any form of excess or mental and physical indulgence must be avoided.

Monoplegic Disturbances of Sensibility in Cortical Paralyses.—It has never been conclusively proven just where the centers governing sensation are situated but it seems to be the consensus of opinion now that they are placed just behind the motor area in the parietal lobe. S. G. KAHN (Med. Rec., Nov. 22, 1902) reports a case of depressed fracture with operation, in which the injury to the brain seems to have been pretty definitely localized in the ascending frontal convolution and the intermediate neighborhood of the Rolandic fissure. There was some destruction of the superficial brain tissue in this region but the man made a good recovery. It was found that he had not only loss of motion but also loss of sensation of the entire left arm, hand and side, down to the lumbar region. The area involved was from the median line in front to the spinal column behind. In explanation of this condition it is suggested—and it has been claimed previously by several authorities—that the centers of sensation are located in the same area with the motor centers but probably upon a deeper plane. The occurrence of both paralyses and anesthesia would depend therefore largely upon the depth of the destruction rather than upon its superficial extent.

The Invulnerability of Epileptics.—The infrequency with which suppuration of wounds occurs in epileptics has been widely commented upon. V. TIRELLI (Rif. Med., Nov. 29, 1902) has sought to determine experimentally whether or no the comparative immunity to stphylococcic infection enjoyed by this class of patients were due to an antipyogenic property inherent in the blood. To this end he treated staphylococcus cultures with epileptic blood-serum before placing them in the thermostat; with the result that the devolopment of such cultures was much slower than that of the control cultures treated with normal blood-serum. Further, when the cultures to which epileptic blood-serum had been added were injected endovenously into animals, they survived longer than those injected with the control cultures. An attempt was made to ascertain whether successive injections in animals of epileptic blood-serum would confer immunity to staphylococcus infection, and also whether the blood-serum of animals subjected to such injections possessed therapeutic value in acute staphylococcus infection. Owing to the accidental death of the animal injected with the epileptic blood-serum, the question of immunity was not determined, but the serum extracted from its body was utilized in the treatment of an animal in whom acute staphylococcus infection had been produced; with the result that it survived twice as long as the control animal.

Friedreich's Disease.—Though usually regarded and described as a hereditary ataxia, it would be more accurate to denominate Friedreich's disease "family ataxia," since the disease seems rather to attack members of the same generation than of successive generations. In one family several children may be attacked while others escape. Errors in diagnosis are no doubt often made, but the literature since 1890 embraces numerous cases which are beyond reproach. Rütemeyer collected 90 cases ocurring in 36 families. The average age at the onset of the illness is 15 years, but it may be more advanced, and it is remarkable that when the disease appears in several members of a family its first symptoms are usually manifested in all at the same age. Thus in a family of six children observed by M. COUSOT (Bull. de l'Acad. de Méd. de Belg., Oct. 25, 1902), three began to suffer with trembling, incoordination and weakness at eighteen years of age. In the most advanced case there are now present titubation, weakness and wasting of the lower extremities, trembling and incoordination in the upper extremities, diminished patellar reflexes, active cutaneous reflexes (plantar, cremasteric, abdominal). Speech is slow, heavy, embarrassed; handwriting uncertain and irregular. The pupillary reflexes are intact and the fundus of the eye normal. Nystagmus is only marked when the patient attempts to look sidewise. When the patient lifts his foot from the ground the toes turn up toward the dorsum of the foot and the plantar arch becomes markedly exaggerated. The picture in this case is classic and the two remaining cases are no less typical, though belonging to an earlier stage of the disease. The lesions in Friedreich's disease are in the posterior and lateral columns of the cord, especially in the column of Goll, the direct cerebellar tract, Gower's tract and in the origin of the fibers in the gray matter (cells of the column of Clarke). A number of autopsies showed also sclerosis of the crossed pyramidal tracts, but Marie maintains that the fibers involved did not really belong to the crossed pyramidal tracts but were fibers of the antero-lateral and the direct cerebellar tracts. The prevailing pathological notion of Friedreich's disease is that it is a sclerosis of the medullary bundles; but this does not explain the occurrence of the disease in several members of the same family. It seems more logical to regard it as essentially a congenital disorder or a developmental disease, of which the sclerosis is merely a secondary manifestation. An anatomical fact which supports this theory is the extreme thinness of the spinal cord in these cases; the dimensions of the cord often are less than three-quarters of those of normal cases, as in the case described by Newton Pitt. The theory of developmental error has the support of Senator, Giuzzetti and others. In Cousot's cases it is noteworthy that all three have high-arched palates. We have here the phenomena of similar malformations in several members of the same family, and of more than one malformation (spinal cord and palate) in each individual. Both of these coincidences have teratological significance. The question arises, Must Friedreich's disease be classified as a teratological condition?

Infantile Paralyses: An Epidemic of 38 Cases.—For the purpose of showing the possible infections and epidemic character of this disease, C. F. PAINTER (Bost. Med. and Surg. Journ., Dec. 11, 1902) places on record 38 cases occurring at Gloucester, Mass., in the summer of 1900. All of these cases were found within a radius of four miles. Many current works on neurology and pediatrics do not refer to the possible infectious character of this disease. No mention of epidemics is found in Holt, in Pepper's "System," in Dana, or in Oppenheim. Epidemics are referred to by Marie, Rotch and Collins, and are reported from original observation by Colmer, Bergenholtz, Cordier, Caverly, Brackett and others. Painter prefaces the clinical history of his 38 cases by a description of the hygienic conditions in Gloucester, from which, however, no important deductions are made. Local physicians attributed the epidemic to great changes in temperature which occurred during the period of the epidemic. Painter believes that there is no doubt about the infectiousness of anterior poliomyelitis, and bases this belief on the great similarity in the symptom-complex as observed throughout all the cases, and the resemblance to symptoms long recognized as indicative of infection. A majority of the cases occurred during, or more frequently a day or two days after, a period of extreme heat; in other cases they followed bathing in the ocean. The clinical histories present nothing unusual. The statistical sum-

mary is as follows: Two-thirds of the patients were males. The youngest was 13 months, the oldest 10 years; 21 cases were three years or younger. No case entirely recovered; one case died.

Neurasthenia and Its Treatment.—Neurasthenia is not a morbid entity, but a combination of conditions, on the recognition of which the diagnosis and prognosis depends. It is a persistent state of enfeeblement of nerve force, due to a nutritive derangement of the nervous elements. As Gilles de la Tourette has said there is no such thing as neurasthenia, but rather a neurasthenic state. There are true neurasthenics and false or hereditary neurasthenics. According to C. N. DE BLOIS (la Rev. Med., Nov. 12, 1902) the objective symptoms of true neurasthenia are slight or none, and the subjective distinctly psychical. They are: (1) Headache, frontal or temporal, like a heavy helmet on the head, and lasting only during the daytime; (2) vertigo, a sensation of cerebral emptiness rather than real dizziness, with feebleness of the lower limbs; everything appears dull and gray, and muscæ volitantes are seen, the oculist being frequently consulted; (3) pains, localized at the back of the neck and along the spine, and especially at the sacrum; (4) in this latter situation being accompanied by fatigue in the legs; (5) no anesthesia, no abolition of reflexes, no urinary troubles; (6) much lassitude, often cannot fix the attention, cannot read; (7) insomnia, a most frequent and important symptom; (8) gastro-intestinal disturbances, poor appetite, slow digestion, heaviness in stomach during digestion (rarely vomiting), gurgling of the intestines. The alimentary tract shares in the general nervous depression; (9) mental condition, sometimes elevated, usually depressed, feebleness of the will, disinclination to work, subjective sensations of impaired function in various organs. The brain remains clear. (10) There is a definite cause to be found for the condition, a distinction from false neurasthenic states.

The treatment consists of a cold douche in the morning every second day, with a warm douche at noon, and on alternate days a warm douche in the morning and a foot-bath at noon. A bath with static electricity for 15 minutes three times a week, injection of artificial serum every second day, and internally iron, bromide of strontium and trional. Hygienic and moral influence are necessary adjuncts to the other treatment.

Two Cases of So-Called Landry's Paralysis; Autopsies.—The first of these cases cannot be regarded as typical of so-called Landry's paralysis. The patient gave a history of a previous attack of sudden paralysis involving both arms and legs, which gradually regained their power, so that the patient was able to resume work after five weeks. The patient remained at work a little more than a month when a second attack occurred. She was examined by E. W. TAYLOR and G. A. WATERMAN (Bost. Med. and Surg. Jour., Dec. 25, 1902) who found paralysis of arms and legs with a certain amount of sensory disturbance, associated with persistent vomiting for several days. At no time was the temperature above 99° F. Nineteen days after the onset of the attack respiratory embarrassment was first noticed; no cranial nerve or brain involvement could be made out. The mind remained clear up to ten minutes before death. A post-mortem examination of the spinal cord failed to show any evidence of inflammatory change; even the ventral horns showed no departure from the normal vascular condition. The meninges were likewise normal. The nerve cells of the ventral horns, on the other hand, showed alterations. In the lumbar and cervical enlargements many cell bodies showed changes characterized by chromatolysis, usually central, displacement of nuclei toward the periphery, marked distortion of the nucleus in many instances, and in others loss of the nuclear membrane. Peripheral nerves did not show ordinary signs of inflammation or of myeline degeneration. In the anterior crural nerve there was a large recent hemorrhage of undetermined source. Such hemorrhages were not found elsewhere, either in peripheral nerves or in the cord. In the oblongata, however, at the level of the hypoglossus and glossopharyngeal nuclei, the blood vessels were highly congested and numerous hemorrhages from the smaller vessels were evident. The oblongata in other respects was normal. As in many recorded instances the pathological changes found do not adequately account for the symptoms observed during life and the fatal outcome. In the second case sensory symptoms predominated at first; motor paralysis was very rapid in onset and showed no typical ascending course. Death occurred five days after the onset of the disease. The pathological examination in this case showed nothing beyond a certain degree of vascular congestion, particularly involving the smaller vessels in the dorsal horns. Nephritis was present; but this certainly does not explain the nervous phenomena. These cases will not assist in the definition or pathological classification of so-called Landry's paralysis. They are simply a further demonstration of the fact that a fatal disease of the nervous system occurs which is not explainable by the post-mortem findings.

Acute Poliomyelitis and Encephalitis.—Upon the question as to what is the cause of the changes noted in these two diseases in the nervous tissues concerned, and epecially as to the part in that cause played by thrombosis, the following points are offered by F. E. BATTEN (Lancet, Dec. 20, 1902): It has been stated by those who support the view that the condition is primarily inflammatory, that many observers have occluded the vessels of the spinal cord for varying periods, and examined the changes so produced, but, although they found marked chromatolysis of the cortical cells, they did not find perivascular exudation or hemorrhage. Furthermore, they state that Dr. Leonard Hill ligated the cerebral arteries in monkeys and the brains of these animals were examined by Dr. F. W. Mott at various periods after the operations, who found extreme chromatolysis of the cortical cells, but no inflammatory change or hemorrhage. Such an argument sounds almost conclusive, and would at once negative the view that there is primary thrombosis, but it must be remembered that obliteration of a large vessel is by no means necessarily comparable to the condition which is produced by thrombosis occurring in smaller vessels. Far more to the point are the experiments of Prevost and Cotard with regard to the changes which take place in an infarcted area. They, by injecting fine tobacco powder into the vessels, succeeded in getting infarcts in various organs, and they proved by these experiments that congestion, hemorrhage, and exudation of cells were the early result of obliteration of small vessels. Having therefore established the possibility of such a condition as is found to be present in these cases of acute encephalitis and poliomyelitis, being due to a primary thrombosis, the next point to show would be that the pathological process may be limited to the distribution of a single vessel. If one therefore studies the vascular supply of the spinal cord it is found that the gray matter of the anterior horns receives its chief supply from branches of the anterior median artery, the white matter being chiefly supplied by vessels arising from the pia mater. The branches of this anterior median artery supply the whole of the gray matter of the anterior horns but not that of the posterior horns. In the spinal cord from

cases of infantile paralysis the line of demarcation between the affected and unaffected part is sharply defined and limited to the gray matter of the anterior horns—that is to say, the area of congestion, or, in the later stages, of necrosis, corresponds very closely to the area of the blood-supply of the anterior median vessel. It cannot be asserted that the process is always thus accurately limited, for it is well known that the vessels in the ventral portion of the spinal cord and outside the gray matter are often engorged and possibly thrombosed, and again in the gray matter small areas of softening are found which do not occupy the whole of the gray matter. Such conditions are easily explicable, since congestion of vessels commonly occurs around an infarcted area and the localized softening in the gray matter is due to the thrombosis occurring in the smallest vessels. The microscopic appearances of the softening of the gray matter of the spinal cord correspond closely with that due to thrombosis of small vessels in the brain. The very frequent occurrence of anterior poliomyelitis in the lumbar sacral region seems to be another point greatly in favor of the view that the condition is primarily vascular, for it is well known that the gray matter of the anterior horns of the lumbar region is situated at a point most peripheral from its blood supply, *i.e.*, the blood derived from the vertebral artery has to travel the whole length of the anterior median artery, and it has been shown by Moxon that the reinforcing arteries of the roots do not readily assist the supply of that part of the cord. These, then, are the points in favor of the disease being due directly to a primary vascular thrombosis; in favor of the view that the disease is of direct bacterial origin may be quoted its prevalence during a certain period of the year, becoming epidemic, as in the present year, and its occurrence in several members of a family in its various forms, either cerebral or spinal, of which a most interesting example has been published by Dr. W. Pasteur. The author's arguments have been drawn chiefly from the pathological examination of the spinal cord, as the opportunity for examination of that part of the nervous system most frequently occurs. But what has been said in regard to the nature of the lesion applies equally to those cases in which the medulla, pons, cerebellum, or cortex is affected, the lesion being a primary thrombosis of the finer and terminal arteries. In conclusion, though there are many gaps to be filled up by further pathological investigation, he trusts that he has given grounds for considering cases of acute encephalitis and acute poliomyelitis as clinically identical; pathologically they are identical. The more frequent recognition of these cases of encephalitis will explain many cases of so-called meningitis in which recovery more or less complete takes place.

Chorea.—The treatment of this disease rarely takes account of the fact that it is often of infective origin, and that there is an equal chance for it to be due to the pathogenic action of the streptococcus and staphylococcus. Having had occasion to trace an autopsy on a victim of chorea in which all the organs were found to give pure cultures of streptococci, P. A. PREOPRAJENSKY (La Sem. Méd., Dec. 10, 1902) concluded that it might be advisable to treat certain forms of chorea with antistreptococcus serum. His first attempt was upon a young girl, eighteen years old, from whose blood pure cultures of streptococci were easily obtained. She presented a grave degree of chorea, which continued to increase in severity, notwithstanding the free use of bromide of sodium, chloral, arsenic and other well-known remedies. After a few injections of antistreptococcus serum the choreiform movements began to diminish, and finally after about two weeks ceased. Various muscular weaknesses and paralyses began to mend at the same time. She suffered a slight relapse, which was checked by the same method. This fact, although isolated, warrants note, and may merit a repetition upon other cases. The same authority notes that he found streptococci in the blood of another patient suffering from this disease in the hospital at the same time.

PHYSIOLOGY.

Saline Diuresis.—The absorption from the renal tubules in the rabbit when the outflow is obstructed, according to A. R. CUSHNY (Jour. of Physiol., Dec. 15, 1902) is differential, the water and chlorides returning to the blood much more rapidly than the sulphates, phosphates and pigment. The presence of these last in the glomerular secretion must therefore tend to retard the absorption of water by opposing osmotic resistance to the absorbing force; when as after their intravenous injection, they are present in large amounts, the urine is increased more than when such permeating bodies as the chlorides are in excess. If the absorption in the tubules under normal circumstances is similarly differential, as appears probable, this is sufficient explanation of the variation in the diuretic action of different salts. The saline diuresis seems to be due not to stimulation of the excretory cells of the kidney primarily, but to the changes in the circulation of the kidney; for when these are excluded, the ingestion of salt solution causes little or no change in the urine, and on the other hand, an increase in the volume of blood, without change in its constituents, appears sufficient to induce diuresis.

Action of Carbon Dioxide on Muscle.—By arresting the liberation of energy, carbon dioxide hastens the fatigue of muscle, according to L. DE LHOTA (Jour. de Physiol., Nov. 15, 1902). In consequence of the arrest the muscle can not exhaust itself, and it preserves the store of energy which can be freed after the removal of the carbonic acid. This gas is therefore a favorable factor in the conservation of the muscular power. Although obtained by methods wholly different, the researches of the author lead to the same conclusions, as those of R. Dubois, drawn from the latter's researches on the mechanism of fatigue and of sleep through carbon dioxide autonarcosis.

The Conditions of Action of the Pancreatic Secretion.—On comparing the ferment-liberating action of the succus entericus from the duodeno-jejunal region of the intestine of the dog with that of an active tryptic extract of pig's pancreas, H. M. VERNON (Jour. of Physiol., Dec. 15, 1902) found that working with a sample of dog's pancreatic juice which contained practically no free trypsin, the latter agent acted considerably more actively than the former. For instance, in six hours at the room temperature, one per cent. of active tryptic extract had set free three times more ferment than had one per cent. of succus entericus. Upon inactive glycerin extracts of the pancreas the active trypsin likewise exerted, as a rule, a more powerful ferment-liberating influence than did the enterokinase of the succus entericus. The ferment-liberating action of enterokinase is retarded by 0.1 per cent. sodium carbonate and almost stopped by 0.2 per cent. sodium carbonate while active trypsin can set free ferment in all strengths of sodium carbonate from 0.05 up to 0.6 per cent. almost as well as in neutral solutions. Also 0.025 per. cent. hydrochloric acid retards the action of enterokinase more than that of active trypsin. The addition of small quantities of bile slightly enhances the action of both ferment-liberating agents probably in virtue of its faint alkalinity, which neutralizes the slight acidity of the zymogen extract. Enterokinase is not

destroyed by the addition of sodium carbonate, but merely paralyzed in its action. After neutralization of the alkali by hydrochloric acid it will exert its ferment-liberating powers as efficiently as before. Dilute hydrochloric acid on the other hand has a destructive action on the enterokinase as well as a paralytic one. Trypsinogen is a more stable body than trypsin, though exact comparisons of stability are difficult, owing to the gradual liberation of enzyme from the zymogen on keeping it with dilute acid or alkali. Still the results obtained show that 0.1 to 0.4 per cent. sodium carbonate destroys nearly twice as much enzyme as zymogen, and 0.05 to 0.1 per cent. hydrochloric acid nearly four times as much when acting for two hours at 38° C.

Chemistry of Blood in Chlorosis.—The following chemical changes were found in chlorotic blood by F. ERBEN (Zeitsch. f. klin. Med., Vol. 47, Nos. 3 and 4). The amount of albumin is diminished, on account of the diminution of hemoglobin; the relation of albumin to globulin is normal and the amount of fibrin increased. There is considerably more fat than normal in both the serum and the erythrocytes; the lecithin is diminished in the total blood and the serum but seems to be increased in the red cells. Cholesterin is present in smaller amounts in both the serum and red cells. In the ash, phosphoric acid, potassium and iron are considerably reduced, calcium and magnesium are increased. The increase of sodium chloride is only apparent, since chlorotic blood contains a higher percentage of serum than normal blood; the amount of sodium chloride in the serum is not, however, increased.

Chemistry of the Liver in Acute Yellow Atrophy.—The following analysis of the liver in one case of acute yellow atrophy, is given by A. E. TAYLOR (Jour. of Med. Res., Nov., 1902). The loss of substance was disproportionate to the reduction in the total weight, hence the liver was hydremic. The nitrogen was in proportion to the dried residue. Glycogen and hexon bases were absent, albumoses and notable quantities of leucin and asparaginic acid were present. The quantity of ash and of fat was normal and the latter contained an excess of free fatty acid and of oxy-acids and alcohols. In conclusion the statement is made that acute yellow atrophy of the liver should not be classed as a fatty degeneration.

Sodium Chloride and the Constituents of the Urine.—The disappearance of the chlorides of the urine, according to R. A. HATCHER and T. SOLLMAN (Am. Jour. Phys., Dec. 1, 1902), does not lead to any very large changes in the other urinary constituents—not sufficient at least to alter the physical properties of this fluid. Nor does the administration of sodium chloride produce such changes. This subject is of practical application from the viewpoints of diagnosis and therapeutics. According to the school of v. Koranyi, heart disease can be diagnosed from a high $\frac{\text{c.t.}}{\text{NaCl}}$ joined with a low c.t. × c.c.; (c.t. is total concentration and is obtained by dividing the depression of the freezing point by 1.89; c.c. is the total quantity of urine for 24 hours in cubic centimeters). The authors' results show that the same change results in at least an equal degree from a milk diet. Unless due value is given to this fact a mistake in diagnosis may occur. The addition of sodium chloride to a milk diet results in a greater excretion of urine and metabolites; the latter are at the same time diluted. The author thinks these effects are desirable especially in fevers. The retention of chlorides shows furthermore that the body requires a certain amount of sodium chloride which is not supplied by the insufficient quantity of this substance contained in the milk. For these reasons the addition of sodium chloride to a milk diet appears commendable. The salt may be added directly to the milk without inconvenience. It should be distributed so that about 15 grams are taken per diem.

The Ripening, Natural Death and Prolongation of Life of the Eggs of the Starfish.—The experiments and observations of J. LOEB (Pflüger's Archiv, Nov. 8, 1902) seem to prove that in the same sea-water and under the same conditions, the ripe but unfertilized eggs of the starfish rapidly die, while the unripe as well as the ripe fertilized eggs remain alive for a longer time. It seems to be certain that the early death of the ripe unfertilized eggs is connected with the intrinsic processes concerned with ripening and is not dependent on the bacteria of the sea-water, since, in the first place, the death of ripe eggs takes place equally as rapid in sterilized sea-water as in non-sterilized sea-water, and in the second place, eggs whose ripening is prevented by extraneous measures, can remain alive for a long time in water containing many bacteria. The author has demonstrated that oxygen and free hydroxyl ions hasten the ripening of the eggs of the starfish, and that on the other hand poverty of oxygen and a neutral or a weak acid reaction inhibits or delays ripening. The fact that the eggs which remain unripe in the ovary of the starfish ripen as soon as they get into the sea-water, receives its explanation, at least in part, from the above circumstances. If the eggs are prevented from ripening by means of oxygen-starvation or by means of acids, they will live longer than if they are allowed to ripen. Moreover the eggs whose ripening has already begun or has been nearly or entirely completed, seem to be protected from an early death by these same influences. The above facts seem to lead to the conclusion that the process of ripening of the eggs and the process of fertilization do not necessarily depend on the same chemical processes. Fertilization by means of the spermatazoon or by means of chemical or physical agencies prolongs the life of the egg, while the processes connected with the ripening of the egg lead, possibly by autolysis, to its death. Agreeing with this is the fact that the same treatment with acids that brings about artificial parthenogenesis of the ripe eggs of the starfish, if used in the case of the unripe eggs of the starfish inhibits the process of ripening. The author believes that these facts confirm his earlier hypothesis that the fertilizing action of the spermatozoon depends upon the fact that it brings substances or conditions into the egg which accelerate the course of certain processes, possibly of a synthetic nature, in the latter. A similar acceleration might, for example, be produced by certain ions as the hydrogen ions of the nuclein-acids, but one must not exclude the possibility that catalytic processes of this kind can be produced by enzymes or other substances or conditions. It must, however, be borne in mind that the author succeeded in producing in unfertilized eggs, by means of certain ions, normal embryos capable of development, but that all the experiments carefully conducted in his laboratory by Gies to accomplish the same by means of enzymes have as yet not succeeded.

Respiratory Metabolism.—Living protoplasm has the capacity to bind oxygen, according to J. ROSENTHAL (Arch. f. Anat. u. Physiol., Nov. 28, 1902), in a compound whose production is accompanied by very little evolution of heat, and this oxygen leads to the formation of carbon dioxide, water and nitrogenous products of which urea is an example. The quantity of this intracellular oxygen is variable; with a high partial pressure of this gas much more of it can be bound than is necessary for the production of the end-products. When the income of oxygen is deficient the formation

of the end-products takes place at the expense of the stored-up intracellular oxygen as long as the supply of this material lasts.

The Iodine-Content of the Thyroid.—The administration of bromides, according to W. A. NAGE and E. ROOS (Arch. f. Anat. u. Physiol., Nov. 28, 1902), does not influence the iodine-content of the thyroid and no storage of bromide takes place in the organ. After extirpation of the greater part of the thyroid gland an increase in the iodine-content of the remaining portion of the glandular mass occurs. If only half of the whole gland is removed, this change takes place distinctly only in those cases in which the animal had become pregnant. In the latter a greater time had elapsed between the extirpation of both portions than in the case of the non-gravid animals. The administration of pilocarpine does not influence the iodine-content. The authors do not draw any conclusion as to the mode of action of the thyroid, at any rate not the conclusion that the gland does not secrete the iodine compounds.

Are the Hemolymph Nodes Organs Sui Generis?—The majority of the structures known as hemolymph nodes appear when superficially examined to resemble ordinary lymphatic nodes. But during the last three decades many investigators have recognized the presence, in man and certain lower animals, of red, spleen-like or blood-containing lymph glands. The questions concerning the source of the red blood cells found in these nodes, and the manner of its entrance into the gland, are answered in various ways. The nodes in question have been variously interpreted as (1) newly formed splenic tissue; (2) neoplasms; (3) hyperemic or hemorrhagic lymphatic glands; (4) lymphatic glands containing red cells formed within the gland; (5) organs sui generis, the so-called hemolymph nodes. A. S. WARTHIN (Trans. Chicago Path. Society, Nov. 12, 1902) supports the view first advanced in 1884 by Gibbes, that the hemolymph nodes are independent and permanent structures; this hypothesis has the support of Clarkson, Drummond, Vincent and Harrison, Weidenreich, Morandi and Sisto. Warthin points out that glands with sinuses containing blood are constantly present in man, the ox, sheep and goat. The hemolymph nodes in man are found only in certain regions, *i.e.*, in the prevertebral fat, and in the retroperitoneal and pelvic fat, and in the neighborhood of the renal and adrenal vessels. Regularity of occurrence indicates specific character. The hemolymph glands are found in conditions in which no coexisting hyperemia is present. The prevertebral hemolymph nodes cannot be regarded as hypostatic lymph glands; their occurrence in the living body and in cadavers in which there is no hypostasis, and the fact that red hemolymph glands are found side by side with pale lymphatic glands, rules out hypostasis as a factor determining the characteristics of these structures. Certain sections of the hemolymph nodes show that in certain of these organs neither afferent nor efferent lymph vessels are present. In those hemolymph nodes possessing afferent lymphatics no red cells are present in the latter. In those nodes in which red cells are found in the efferent lymphatics the red cells are brought to the node in the blood vessels and not in the lymphatics. Communication between the blood and lymphatic systems must occur within the node. The most marked differences between the hemolymph node and the ordinary lymph glands are shown in the course and structure of the blood vessels; further differences of structure are numerous. Among the hemolymph nodes themselves a great variety of form is found. Some possess a spleen-like pulp and may be termed splenolymph. A second type of node containing blood-sinuses does not contain spleen-like pulp; this class may be designated hemal gland, as suggested by Clark. A third type resembles the ordinary lymphatic node, but differs from it in possessing reticular spaces which on one side communicate with blood vessels, and on the other with efferent lymphatics; in the lymph-sinuses of these a mixture of bloom and lymph is found; to this type Warthin would restrict the term hemolymph or blood-lymph node. All types and varieties are to be gathered under the comprehensive designation lymphatic glands, hemolysis being the chief function of these organs. Aside from the destruction of red cells, these nodes serve as centers for the formation of leucocytes and blood plasma, and probably also take part in the destruction of leucocytes. Eosinophiles are also formed in large numbers in these glands, the eosinophile granules arising from the disintegration products of red cells taken up by mononuclear leucocytes, the nuclei of which become polymorphous.

Animal Fluids and Tissues in Physico-Chemical Relation.—The difference between the peptic and the tryptic digestion of albumen, according to M. OKER-BLOM (Skand. Arch. f. Physiol., Dec. 12, 1902) appears at the present day distinctly in the different relation of the electric conductivity and the lowering of the freezing-point of the respective mixtures. In tryptic digestion the electric conductivity and the lowering of the freezing-point increase regularly up to a certain limit; above all, the lowering of the freezing-point increases relatively more rapidly than the electric conductivity, after a time giving way to the opposite relation, which brings one back to the fact known for a long time, that the first splitting-products of albumin are non-conductors, while the later products are electrolytes. In peptic digestion the electric conductivity has a steady fall, which is to be attributed to the affinity between the resulting splitting-products and hydrochloric acid; and indeed this occurs up to a certain point which does not appear to be dependent on the absence of free hydrochloric acid. With reference to peptic digestion the lowering of the freezing-point is a variable factor, and affords no definite interpretation of the corresponding processes of hydrolysis.

The Hemolymph Glands and Spleen.—It is probable that in addition to the spleen, glands which may be placed in the category of "hemal" or "hemolymphatic" are universally present in mammalia, according to T. LEWIS (Internat. Monatschr. f. Anat. u. Physiol., Vol. 20, Nos. 1 to 3). These are distributed with considerable degree of constancy in three main groups—renal splenic and subvertebral. The blood or blood-lymph spaces of these glands are traversed by a fibrous reticulum, forming a network of spaces lined by cells commonly called "reticulum" cells, which form a continuous layer with the typical endothelial cells bounding the sinus and lining the vessels entering or leaving it. In the modified hemal glands of the rat, small arteries open directly into the sinuses, while veins proceed from the sinuses and appear to have direct communication with them, being strongly guarded by valves. The glands in the rat and dog have been observed to have an abundant nerve supply from the sympathetic. Stimulation of the nerves or the gland itself causes slight but definite paling of the organ and a diminution in size. In the hemal lymph glands the blood and lymph streams meet and to a great extent mix. Hemal glands, inclusive of spleen and hemal lymph glands are centers for the destruction of the blood elements, both red and white. Glands falling under the head of ordinary lymph glands may have this function to a slight degree. This takes place by a process of phagocytosis common in all. The process as applied to an erythrocyte is briefly as follows: A red cell is ingested by a phagocyte, and the cell contents

are first liberated; the globular mass of hemoglobin is transformed into granules of bright yellow pigment, by a gradual process extending from the periphery to the center of the globule. The final product appears to be a substance allied to bilirubin, and is liberated in the adenoid tissue. In the rat the lower members of the hemolymph series are in proportion to their size, if not absolutely, more important as destroyers of erythrocytes than the spleen. The phagocytes are probably derived from any of the endothelial cells attached to the wall of the sinus or meshes of reticulum. It is not impossible that still others may be transformed varieties of leucocytes. The hemolymph glands form structurally an almost unbroken chain of organs, the simplest or least differentiated being the ordinary lymphatic glands, while the most highly differentiated is the spleen. Between these extremes are found structures of every possible gradation, including hemal lymphatic glands, hemal glands and accessory spleens. The spleen pulp is not only homologous with the sinus of the lower members of the series, but structurally is almost identical with it. This sinus is marked off from the adenoid tissue represented by the Malpighian corpuscles, by a definite endothelium, in every way comparable to that found in typical hemal glands.

Oxidase and Lipase in Milk.—Possessing certain properties characteristic of living substance, milk, according to A. B. MARFAN and C. GILLET (Mtsheft. f. Kinderh., Nov., 1902), contains ferments and perhaps also alexines. Of the former oxidase may easily be detected by adding to milk (one c.c.) an equal bulk of tincture of guiac and a few drops of hydrogen peroxide, when a blue coloration results. It is destroyed at a temperature of 78° to 79° C., it does not dialyze, and it passes slowly and with difficulty through a porcelain filter. Its activity is weakened by the majority of antiseptics. There is, therefore, in cow's milk a ferment which, unlike the true oxidases which work merely in the presence of air, is capable in the presence of the peroxide of hydrogen of causing oxidation. It is, therefore, an indirect oxidative ferment and has been called by Bourquelot, anaeroxydase. It is uniformly distributed in the milk, united to the proteid but more closely to the soluble albumin than to the casein. It is present in the milk of the goat, cow, sheep and bitch in the descending order of activity. It is not found in woman's, ass's and mare's milk. The reaction is occasionally seen in human milk as the result of the presence of colostrum corpuscles, for the polynuclear leucocytes contain the indirect oxidase. This fact is of note, particularly in reference to the theory now current, that the oxidases come from the leucocytes, and that the ferments present in the tissues and fluids come from destroyed leucocytes. Likewise pus gives this reaction. If an energetic oxidase reaction is found in milk seven or eight days after parturition, one may suspect some purulent process in the breast. Lipase or monobutyrinase was discovered by the authors in 1900, who found that fresh milk can decompose monobutyrin into butyric acid and glycerin, which is not the case with cooked milk. This ferment is of great activity in human milk, but of slight activity in cow's milk.

Concerning Antiferments.—For a long time, according to E. WEINLAND (Zeitschr. f. Biologie, Vol. 44, N. S., Vol. 26), the fact has been recognized that animals parasitic in the stomach and intestine, *e.g.*, worms belonging to the groups nematodes, trematodes, cestodes and acanthocephali, are not affected by the digestive juices that cause solution of the remaining ingesta. The cysticerci, or larvæ of teniæ, in order to reach the intestine, must traverse the stomach and withstand the acid and pepsin of the gastric juice. The bladder is dissolved, but the head and neck remain. The researches of the author indicate that there is no doubt that the parasitic worms living in the stomach, intestine, peritoneum, liver, etc., are protected against the proteolytic ferments liberated by these organs or contained in their juices, by virtue of specific bodies, antiferments, which are formed in the body of the parasite; these inhibit the action of pepsin, or trypsin, and may be called "antipepsin" or "antitrypsin." This body can be precipitated from the expressed juice of the animal acting as parasite, without fully losing its activity. Fibrin can be impregnated with this substance and thereby withstand the action of the proteolytic ferments for a longer or a shorter time. Heretofore physiologists have speculated as to how the mucous membrane of the digestive tract resists the action of the proteolytic enzymes. With the above results as a suggestion toward the solution of this problem, the author undertook an investigation with the following results: The intestinal mucosa of the higher animals contains a substance, antitrypsin, which possesses substantially the same properties as that found in ascaris. It can be obtained in the form of an extract from which by means of alcohol a precipitate may be obtained and dried. This is sensitive to higher temperatures, and by the process of isolation loses much of its activity. In the extract obtained from the mucous membrane of the stomach there is a body having antitryptic properties, and besides it contains a ferment which in spite of the antiferment, is capable of digesting fibrin in an alkaline medium. The antiferments are contained in carnivorous plants, *e.g.*, drosera, dionaea, and also in the protozoa. The question arose whether they are present in all the cells of higher animals. This has been answered in the affirmative by certain investigators who detected the presence of antiferments in liver, muscle, defibrinated blood and blood serum, and in the red blood cells of the pig. These bodies prevent the autolysis of living tissues.

Effect of Cocaine upon Intestinal Absorption.—As it is generally recognized that cocaine exercises a paralyzing influence upon living protoplasm, A. BALDACCI and G. GUIDO (Rif. Med., Dec. 2, 1902) have availed themselves of this property to determine how much of the absorption which takes place in the intestine depends upon the purely physical processes of osmosis and diffusion, and how much upon cellular activity. For this purpose, a series of experiments was carried out upon rabbits; a section of the small intestine being isolated, tied at either end, and again at a point midway between the two ligatures. In one of the subdivisions thus formed, a solution of cocaine was injected, and in the other, distilled water or normal salt-solution. The comparative absorption in each was then tested with injections of glucose, strychnine and fatty substances; with the result that absorption was found to be noticeably diminished in that part of the intestine treated with cocaine; from which the authors conclude that intestinal absorption is not a purely physical process, but depends upon the activity of the intestinal epithelium. Further experiments are to be made, to ascertain whether absorption would be entirely abolished by larger doses of cocaine.

On the Rôle of the Spleen in the Hemolytic Function.—The hemolytic activity of the spleen is always assumed, but has not often been conclusively demonstrated. For the purpose of throwing light on this question, L. LAPICQUE (Soc. de Biologie, 1902, p. 949) injected 35 to 40 grams of fresh blood per kilogram into normal and splenectomized dogs. In this manner the red blood cells were increased to nine or ten millions. It was found that after 10 or 12 days the number of red blood cells became normal, and this took place with

equal rapidity in the splenectomized and the normal animals. Apparently the removal of the spleen interfered not at all with the hemolytic process. In normal animals the blood coloring matter resulting from the disintegration of red cells is found abundantly in bone-marrow and spleen, in small quantities in the liver, and not at all in the lymph-glands. After the removal of the spleen this material is most abundant in bone-marrow, is present in small amounts in the liver and in traces in lymph nodes. The hemolytic system is evidently widespread and the spleen forms but a small part of the whole.

Secondary Sexual Characters.—An experimental investigation of a subject that has for a long time been determined a priori as well as from observation of the results of surgical castration, has been conducted by A. FOGES (Pflüger's Archiv, Nov. 8, 1902), who draws the following conclusions: The development of the secondary sexual characters is dependent on the amount of the functional substance of the reproductive glands. The transplantation of portions of the testicles and their preservation in a healthy condition appears to succeed more readily in animals in which at least a portion of the testicles remains in the normal location. In animals, however, in which the latter is not the case, this transplantation also succeeds. The transplantation of testicles or ovaries from one animal to another, in the long run did not succeed. Completely castrated cocks with transplanted functional testicular tissues had the complete characters neither of the capon nor of the cock. From the above facts are to be concluded that the testicles have an internal secretion upon which the secondary characters of sex depend.

The Depressor Nerve as Reflex Nerve of the Aorta.—Both histological investigation and physiological experiment point to the aorta as the final aim of the depressor nerve, according to G. KÖSTER and A. TSCHERMAK (Pflüger's Archiv, Nov. 8, 1902). Any further relation of this nerve to the heart itself is not excluded by the results of the experiments, nevertheless the anatomical findings preclude such a possibility. The theory of Ludwig and Cyon concerned with the stimulation of the depressor nerve as the result of increased blood-pressure and with its regulatory function as a depressor nerve, has lately been strengthened by the discovery of Pawlow that during a state of exalted blood-pressure, the section of both depressor nerves causes a further rise in the pressure of the blood. The results of the authors that a rise of pressure in the intact arterial system, as well as artificially distending the isolated aortic arch by means of normal salt solution, is capable of stimulating the depressor nerve, is another argument in support of this doctrine. The authors believe that the point of stimulation of the depressor is the aortic arch and not the heart.

Oxygen and Muscle Metabolism.—The progressive loss of irritability in a surviving muscle, according to W. M. FLETCHER (Jour. of Physiol., Dec. 15, 1902) is markedly delayed by an abundant supply of oxygen. The advent of natural rigor mortis is delayed apparently indefinitely by the same influence, even when special means are taken to hasten it. These preservative actions of oxygen appear to be independent of the shape of the muscle and its surface relations, and no confirmation has been found of the view of Hermann that the action of oxygen on muscle-substance is twofold, one effective at the surface, and the other opposite in character, effective below the surface. The phenomena of fatigue resulting from active contractions in an excised muscle, are irrespective of its shape, diminution in intensity and rapidity of onset, mitigated by a contemporary adequate supply of oxygen, and marked recovery from the effects of fatiguing contraction may be seen in a muscle deprived of nutriment, but exposed freely to oxygen. The survival discharge of CO_2 from an excised muscle is increased during periods of contraction in the presence of abundant oxygen, the increase being proportionate or roughly so, to the number and degree of the contractions. In agreement with observations already published, this additional yield of CO_2 accompanying contraction is absent or incomplete in the case of a muscle made to contract in air or in nitrogen. It is suggested that the delay of rigor mortis and of fatigue effected by the presence of available oxygen, marks the completeness with which in the presence of oxygen, the dissociative processes alike of resting and active muscle, advancing slowly in the former and rapidly in the latter, result in the formation of free CO_2, and that the hastening of rigor mortis and fatigue in a muscle from which oxygen is withheld, are due to an increased accumulation under circumstances of deficient oxidation, of the metabolic products within the muscle which are the potential precursors of CO_2.

The Submaximal Electrical Response of Nerve.—Records of the submaximal electrical response of nerve evoked by single stimuli of a weak character were obtained by F. GOTCH (Jour. of Physiol., Dec. 15, 1902) by means of a capillary electrometer and compared with the maximal responses evoked by single maximal stimuli. Such records furnish the first direct proof of the fact that the active phenomena of a nerve trunk vary in magnitude within certain limits as the stimulus which evokes them varies in intensity; they also show that the rate of propagation of the excitatory wave is the same whether this is maximal or submaximal. Comparison of the submaximal with the maximal response shows that although there is an obvious difference in the amount of the electromotive force, there is little or no difference between such time relations as the moment of commencement, the moment of culmination of the production of electromotive force, and the rate at which this electromotive force disappears. Submaximal effects closely resembling those evoked by a weak stimulus applied to a nerve can be also obtained by exciting a portion of the nerve fibers which the trunk contains; even when the partial excitation is fully adequate for the part excited, the response evoked in the nerve trunk retains its submaximal character. Of the two conceivable factors which are concerned in the production of submaximal effects in nerve and muscle, that of the number of elements aroused appears to be by far the more potent; the other factor, that of graded intensity of actual effect in each individual element as dependent upon similar grading in the intensity of the stimulus, does not appear to be conspicuous and would not account for the identity of time relations. These experiments indicate as regards both muscle and nerve the obvious gradation in the intensity of active effect dependent upon intensity of stimulus, is mainly due to these tissues, being composed of a large number of elements having no physiological continuity with each other; when, as in cardial tissue, such continuity exists, there is no distinction between responses and no difference of maximal from submaximal stimuli.

Temperature Range in Ether Anesthesia.—It is a well-known fact, according to S. SIMPSON (Jour. of Physiol., Dec. 15, 1902) that chloroform, ether, alcohol, morphine, and other narcotics have the power of paralyzing the heat-regulating mechanism, so that a warm-blooded animal can no longer maintain its temperature and becomes for a time being cold-blooded. It is remarkable that an animal so high in the scale of homoithermism as the monkey should suffer no bad effects from having its temperature reduced to 14° C. (57.2°

F.) a fall from the normal of about 44° F. When the rectal temperature fell sufficiently low, from 25° C. to 23° C., a condition of what might be termed "artificial hibernation" was induced, and in this condition the animal remained and tended to take the temperature of the medium in which it was placed. It had no power of self-recovery and continued to sleep on until warmed by artificial means.

Effect of Lymph on the Coagulability of Blood.—An addition of lymph, from whatever source that lymph has been obtained, brings about a notable acceleration of blood-coagulation, according to A. E. WRIGHT (Jour. of Physiol., Dec. 15, 1902). There can therefore hardly be any doubt that the acceleration of coagulation observed when blood has come in contact with the wound, or when a piece of muscle is introduced into shed blood, is an acceleration due to an admixture of lymph. The effect of the lymph is attributed to the coagulative albuminous element which is removed by clotting. The above phenomenon is seen in post-mortem examinations, it being quite common to see the blood suddenly coagulate on issuing from the heart and mixing with the pericardial fluid. It is also seen when one makes pressure on the tissues to drive the lymph into a bleeding wound. It is further seen in the phenomenon of Delezeme, when blood from a ruptured vessel exudes on to a raw surface which is bathed with lymph, such, for instance, as a weeping eczematous surface or the floor of an ulcer.

Snake Venom and Nerve Cells.—As the result of poisoning with the venom of the Australian tiger-snake, BASIL KILVINGTON (Jour. of Physiol., Dec. 15, 1902) found the following changes in nerve cells: (1) Chromatolysis, the Nissl granules breaking into dust and ultimately all the stainable substance disappears; (2) the staining never becomes diffuse through the cell; (3) no swelling of the cell occurs; (4) the outline of the nucleus is lost, but it retains its central position as a rule; in the very worst cases the nucleus disappears; the nucleolus is usually distinct, though it sometimes appears loose in the cell; (5) the changes are very unequal in different cells; (6) the cells around the central canal of the cord show the earliest and most advanced degeneration; (7) with rapidly fatal doses no microscopic changes occur. The degree of these changes is dependent on the time the animal survives; (8) inflammatory and vascular changes are absent.

The Fate of Fat in the Organism.—The derivatives of nitrogenous bodies have been the subjects of many careful investigations in recent years, but authors have bestowed relatively little attention to the derivatives of the fats. The rôle played in the organism by one of these constituents, glycerin, is the subject of a study by H. LEO (Berl. klin. Woch., Dec. 8, 1902). The splitting of fat and the release of glycerin occurs in the stomach as the result of the action of a specific enzyme. This was shown to be the case by Volhard, whose experiments have been repeated with partial success by Leo. In the intestine, owing to the action of steapsin, glycerin must also be present after the ingestion of fat. A part of this glycerin is absorbed by the intestinal epithelium, but reunites with the temporarily freed fatty acid and resumes the form of fat molecules. But an appreciable portion of glycerin is absorbed as such; hence, while free fatty acids and soaps are often found in considerable quantities in the feces, glycerin is never present. On the other hand the chyle may include neutral fat after the ingestion of a fatty acid, showing that a synthesis with glycerin has taken place in the intestinal mucous membrane, and that glycerin is produced in the organism. Where this glycerin is produced is not definitely known. Intestinal disturbance is sometimes produced by a diet rich in fat. The question may be asked whether such disturbance is not due to the presence of large quantities of glycerin in the bowel. Leo believes this to be a plausible hypothesis, although he was unable to discover any glycerin in the feces of nurslings suffering from diarrhea. His failure to find glycerin he attributes to its absorption from the lower bowel after it has exercised its well-known irritating effect in the upper bowel. The normal urine contains no glycerin. If, however, an adult take by mouth 20 grams or more of glycerin, traces of glycerin begin to appear in the urine. In diseases characterized by rapid wasting and loss of fat, such as carcinoma and tuberculosis, the urine fails under ordinary circumstances, to contain any trace of glycerin. It might have been supposed that in these diseases a portion of the considerable quantity of glycerin released in the tissues would escape oxidation, but this does not occur. Leo sought in vain for glycerin in the urine of patients suffering from circulatory diseases accompanied by diminished oxidation. In febrile disorders the findings were the same, and in one disease only, diabetes insipidus, could glycerin be demonstrated in the urine. There is insufficient proof as yet to establish this latter finding as a characteristic and constant metabolic variation in this disease.

HISTOLOGY, PATHOLOGY AND BACTERIOLOGY.

Artificial Development of Parasitic Tumors.—By the injection of *Plasmodiophora brassica* into rabbits, W. PODWYSSOTZKI (Zeitsch. f. klin. Med., Vol. 47, Nos. 3 and 4) was able to produce artificial tumors. They are mesodermal in origin and resemble perithelial, infectious granulomata. The spores of the germ are engulfed by the phagocytes and stimulate these to mitotic and amitotic division. The parasites themselves may coalesce so completely with the protoplasm of the cells that they can no longer be distinguished. The chief mass of the spores is destroyed within the phagocytes. A few of the spores will show signs of proliferating and some may be liberated and infect other cells. The original cell will then show empty capsules. Where the parasite has been killed before it is injected, such tumors do not result.

Pathology of Adams-Stokes Disease.—A very interesting case of Adams-Stokes disease has been observed by H. LUCE (Deutsch. Arch. f. klin. Med., Vol. 74, Nos. 3 and 4). On autopsy, a sarcoma was found to involve the upper third of the septum of the heart. A very careful microscopical examination of the nerves of the heart proved that organic lesions of the septum can cause a severe, secondary, retrograde degeneration of both vagus nerves. A large part of the course of both vagi seems to lie in the septum. The peripheral vagus endings reach the muscle of the ventricles directly without the intervention of ganglia. As far as a trophic influence is concerned, the heart seems to be independent of the vagi. Bradycardia, in cases of bilateral degeneration of the vagi of central or peripheral origin, points to a muscular origin of this condition which is to be regarded as an altered functional state of the heart muscle. Insufficient nourishment, general dyscrasiæ, toxic, infectious and nervous influences of various characters may favor the development of bradycardia. Even the complete destruction of the upper third of the septum or its replacement by tumor tissue can be without influence upon the rhythm; in the case mentioned the tumor must have existed for a long time with a regular heart action. The Adams-Stokes symptom-complex may develop at every age and with every cardiac disease of organic or functional nature. The course is acute, sub-

acute or chronic and recurrent. It may be curable. Arteriosclerosis need not necessarily be present. The nervous symptoms vary and depend upon the individual reaction of the central nervous system especially the medulla, on the slowed circulation owing to the diminished heart-beats. No characteristic set of symptoms belongs to tumors of the heart.

A New Bacillus of Angina.—The bacteria hitherto described as causing the ordinary non-diphtheritic angina, are of two kinds: either streptococci or the so-called fusiform bacillus. During an epidemic in a small German town a new germ has been encountered by H. BONHOFF (C'blatt. f. Bakt., XXXII, No. 12). Clinically the disease was marked by very severe general symptoms at the onset, such as fever up to 104° F., severe headache and malaise and difficulty in swallowing. The appearance of the throat did not stand in proportion to these signs, since there were only a few discrete spots on the tonsils and never a distinct membrane. After three to four days improvement set in and convalescence was rapid. A bacteriological examination of the throat showed that the disease was due to short bacilli occurring in threads of three to five. Motility was not present. The germs stained readily with Loeffler's solution, especially when warmed; Gram's method gave negative results. The question as to whether spores are formed, could not be definitely decided. On artificial media the growth is characteristic since it takes place only with higher temperature and is marked by peculiar folds when the cultures have attained some age. For animals the germ did not seem to possess much virulence.

Granules of Anthrax Bacilli.—By means of a peculiar reaction, A. DIETRICH and G. LIEBERMEISTER (C'blatt. f. Bakt., XXXII, No. 12) could demonstrate that the granules found in anthrax bacilli really serve to bind the oxygen for the cell. If the bacilli are suspended in a weak alkaline solution containing dimethyl-paraphenylendiamin and naphthol, naphthol blue will be deposited at the site of the granules, which shows that nascent oxygen is present here. Concerning the composition of the granules, no definite statement could be made since they proved singularly resistant to all solvents and chemical agents. It is probable, however, that they belong to the nucleins. Similar bodies were found in the diphtheria, typhoid, colon and tubercle bacilli and in the cholera germ. They were absent in the bacillus of malignant edema, the *Bacillus proteus vulgaris* and the *Bacillus prodigiosus.*

Pathogenesis of Leucemia.—According to the theory of A. PAPPENHEIM (Zeitsch. f. klin. Med., Vol. 47, Nos. 3 and 4) the large lymphocyte is the mother-cell of all other forms of white cells. Hence these lymphocytes are found in all forms of leucemia, even in the myelogenous type. Leucemic blood diseases are best divided into three clases: (1) Lymphocytic pseudoleucemia; depending upon a diffuse proliferation of lymphoid tissue in the glands or spleen or a circumscribed proliferation in the bone-marrow; (2) lymphocytic leucemia, where there is a diffuse growth of degenerated, lymphadenoid marrow tissue, and (3) mixed-cell leucemia, resulting from proliferation of normal, specific marrow tissue. It follows from this classification that every true leucemia is myelogenous in origin, and every pseudoleucemia, lymphatic or splenic. A myeloid pseudoleucemia does not exist. The blood-changes of leucemia do not necessarily depend upon a hyperplasia of the entire marrow; for the long bones may remain intact. The blood-changes constitute the most prominent characteristics of the disease, yet they are only one of its symptoms and an absolute diagnosis may be possible only from the microscopical examination of the marrow. Pseudoleucemia and lymphocythemia are similar in as far as they depend upon proliferation of lymphoid tissue, yet they differ in that the seat of the proliferated tissue varies in the two diseases. Besides the two typical forms of lymphocytic leucemia there are a number of atypical, intermediary forms in which mononuclear leucocytes occur in the blood and bone-marrow besides lymphocytes. Splenic anemia is distinguished clinically from pseudoleucemia by more severe anemia and secondary leucocytosis and myelocytosis with relative lymphocythemia.

Permeability of the Berkefeld Filter.—In determining the permeability of the Berkefeld filter, W. B. WHERRY (Jour. of Med. Res., Nov., 1902) found that the bacillus producing pneumonia in guinea-pigs will pass through the pores of a small filter, but not through a larger one, perhaps on account of the greater thickness of the walls, the relatively small amount of fluid passed through, and the somewhat diminished pressure. Nor did it pass through the Pasteur-Chamberland bougie. It is probable that these filters will be found even less efficient when very turbid, concentrated cultures are passed through. *Bacillus coli communis* did not pass through any of the above filters, and it and the organism from pneumonia in guinea-pigs grow through the walls of the Berkefeld filter very rapidly, through the wall of the Pasteur rather slowly. It seems justifiable to conclude that if the virus of a disease passes through the pores of the Berkefeld it is not necessarily ultramicroscopical. Further work with micro-organisms of various sizes might help in defining the size of the pores of such a filter and determine whether various filters of the same make have the same sized pores or not. It would seem advisable that workers should make a preliminary test of filters, by employing some such minute organism.

Hemolytic Potency of Certain Sapotoxins.—Of the sapotoxins and their allies, A. A. BRUERE (Jour. of Med. Res., Nov., 1902) has found quillaja-sapotoxin, cyclamin and saporubrin to be powerfully erythrolytic. Their potency depends (*a*) on their purity, (*b*) on the nature of the media in which they are dissolved; they are more active in hypotonic than in isotonic solutions; they are more active in aqueous solutions than in serum (*c*) on the presence of salts capable of affecting the permeability of the red cells. The sapotoxins liberate hemoglobin from the red cells, whether these be moist or dry; but they are without action on the stromata of red cells, fixed by formalin after drying at the room temperature, and of the red cells fixed by heat or by alcohol and ether. Acting as protoplasmic poisons they quickly kill the leucocytes, causing cessation of their movements and also exert a solvent action upon the granules of the granular leucocytes, but do not impair the staining properties of their nuclei. They do not inhibit the disintegration of the blood-plates in fresh blood, but they are without action on the plates after fixation. Finally, dissolved in blood-serum, they slightly delay the onset of clotting. Cholestrin plays no part in the neutralization of the sapotoxins studied.

Study of Eel-Serum.—Eel-serum, when injected into the veins of the rabbit or guinea-pig, has been found to be extremely poisonous by J. DE LISLE (Jour. of Med. Res., Nov., 1902). There is both an immediate and a remote effect, and rabbits resist the latter effect much better the the former, while with guinea-pigs the reverse is true. Immunization of the guinea-pig with eel-serum has not yet been attained, while with the rabbit it is a delicate, though usually successful task. The serum of a rabbit that has been vaccinated with eel-serum possesses antitoxic properties that neutralize the poisonous action of eel-serum. The latter can dissolve the blood-globules of the normal rabbit. The resistance of the blood-globules of a rabbit that has been vaccinated is

somewhat higher than normal. The globules of a normal rabbit have the power to fix and neutralize the poisonous principle. This property is missed if the rabbit has been treated with eel-serum or eel blood-globules. This is one fact which proves that the antitoxine is produced by the red corpuscles of the rabbit. A rabbit vaccinated with the blood-globules of the eel produces a serum that gives a heavier precipitate when mixed with eel serum, than the serum of a rabbit that has been vaccinated with eel-serum. The serum of a vaccinated rabbit can dissolve the blood-globules of the eel in vitro. When an eel has been vaccinated with serum or globules of a rabbit, its serum will protect the normal eel's globules against the dissolving action of the hemolytic rabbit serum. Hence it follows that the organism of the eel has been excited by this vaccination to produce an antitoxin. Inasmuch as the red globules of a vaccinated rabbit offer a higher degree of resistance to the dissolving action of eel-serum than do the blood-globules of the normal rabbit and the inability of the blood-globules of a rabbit that has been vaccinated, to neutralize the toxic principles in the eel-serum, together with the non-production of the sensibilizing body, the author concludes that eel blood, when injected into a rabbit, excites the red globules of that animal to produce an antitoxin.

Transference of Bovine Tuberculosis to Man.—This important topic is by no means thrashed out, if we are to judge from the voluminous leading article by Dr. Robert Koch (Brit. Med. Jour., Dec. 20, 1902). As vigorously as ever he defends the view that human beings are rarely if ever infected directly or indirectly from cattle. A year and a quarter ago he issued to the Board of Education of Prussia a request that invitations be sent to the heads of the University clinics throughout Prussia asking them to put him in communication with such cases of primary intestinal tuberculosis as seemed to them to have incurred the disease through the use of the milk of cows suffering from Perlsucht. Heller in Kiel received a special invitation of this kind because very singularly it was reported by him that Kiel had 37 9/10 per cent. of primary intestinal tuberculosis in children. This, by the way, is almost one per cent. higher than the very high rate credited to Boston by Councilman. Up to date, however, Koch had received no case of primary intestinal tuberculosis, despite the far-reaching nature of the call for such cases. The author reviews the literature on the subject very fully, but fails to find that the cases reported are convincing when subjected to careful criticism. He says that those cases in which illness has been supposed to follow the ingestion of meat infected with Perlsucht, a large number of which have been reported, seem utterly without foundation. Ostertag, an expert on meat inspection, says: "Day by day an uncounted number of tuberculous organs come into the market and are consumed. It is only of very recent years, however, that the meat inspection has been at all rigorous, and there is no history of any epidemic which can be traced to such a source. In fact, many families, and even whole villages were found, when this matter was looked up, where tuberculous meat was known to have been eaten in great quantity without tuberculosis having occurred more frequently among them than elsewhere. As a result of these various investigations, the danger of Perlsucht is beginning to be thought much overestimated. At the Congress on Tuberculosis in Paris is 1890 and 1891, the complete exclusion of this type of meat was decided upon. In 1893 and 1898, however, a more rational path was chosen and the sale of the flesh of those animals in which the infection had been local was permitted. At the Seventh International Congress on Hygiene in London, the complete exclusion of tuberculous meat was unanimously set aside. Although the public, as a whole, labor under the impression that they safeguard themselves from infection by bovine tuberculosis, it is a clear case of deception, for although these people conscientiously boil their milk, it is usually only to the extent of scalding it in a wide-mouthed bottle for a short time, for milk, as is well known, is prone on the application of high heat, both to boil over and to scald. This does not kill the germs. It would seem, therefore, very strange to the author that if human beings could be contaminated from the cow's milk that whole communities should not at times suffer the profoundest infection. The fact, which has not been brought out in prominence at all is that the butter made from the cream of cows infected with Perlsucht very frequently contains living Perlsucht bacilli. As a rule, those who are most careful in boiling their milk give no thought to the butter which comes from the same source. In conclusion, Dr. Koch says that he neither could nor would contest the possibility that single cases may occur, but in order to be convincing he believes they should fulfil the following conditions: (1) Certain proof of tubercle in general and where possible of the primary focus must be supplied; in other words, in adults, the clinical symptoms must be unassailable. In children such symptoms are altogether too uncertain and recourse must be had for positive evidence to autopsy; (2) other sources of infection must be excluded with certainty and the question of heredity is of paramount importance. Along this line also should be mentioned the fact that other sources of infection must be carefully looked into, such as tubercle bacilli, which are frequently found round the nails of children; (3) the condition of the people who have partaken of the infected food with the patient and under like conditions must be ascertained; (4) the condition of the cow must be reported upon, it being altogether insufficient that the cow shall have suffered from Perlsucht in a distant organ. Tuberculosis of the udder is the only lesion through which the milk can be infected with the germs. The author has examined from these four standpoints the 28 cases which seem most convincing, from among the large number reported. He found that in only 10 cases had an autopsy been done and only seven of these were said to have had intestinal tuberculosis. In only three cases was it stated that the milk came from cows with tuberculous udders. In not a single case were the other possibilities of infection excluded. In no case was anything said about other people who had had exactly the same environment as the patient. Provisionally we can as yet only say that the injurious effects of milk infected with Perlsucht and its products are not proven. He would leave to the individual judgment the significance of this lack of proof as contrasted to the immensely frequent opportunities of infection. He repeated what he said in his London address, that the fight with tuberculosis, in order to succeed, must not catch at the straws which observation proved the whole problem of bovine infection to be, but deal with what is really the only source of infection, to wit: tuberculous man.

Hair Balls in the Stomach.—Only about 24 cases of this peculiar condition are recorded. In almost all of these there has been a failure of diagnosis during life and a consequent fatal termination. "In view of this it is highly probable," writes W. SALTAU FENWICK (Brit. Med. Jour., Nov. 29, 1902) "that particularly among the insane, many of these cases, failing to be examined after death, are wrongly ascribed to peritonitis, and that the condition is more frequent than is gener-

ally supposed. Of the 24 cases recorded, no less than 23 were females, the youngest of whom was eighteen and the oldest thirty-four at the time of death. The mode in which these unfortunate young women filled their stomachs with hair is usually similar in all cases. It begins by her forming the habit of biting the ends of the hair, or possibly if she be a mother, of plucking hairs from her children's heads while playing with or ministering to them. One patient, it is recorded, would habitually clean her comb with her fingers and unwittingly put the bunch of hair into her mouth. The symptoms are nil until the concretion has reached a considerable size, and the capacity of the stomach has been materially diminished. Vomiting may not appear at any stage, even though the organ may be completely filled with hair, and the same is true of pain. As a rule, however, after a prolonged period of intractable dyspepsia, the patient experiences nausea and pain. This latter gradually becomes localized to the epigastrium and is increased by pressure. Vomit is scanty and acid, occasionally blood stained, but singularly enough it rarely contains hair. On physical examination, there is always, in cases far enough advanced to have subjective signs, a tumor which can be both felt and seen. It has been described as "kidney shaped," "crescentic" or, "like a spleen." Occasionally the stomach is so displaced by the weight of this mass that it may lie in the pelvis. The lower border is well defined and the tumor is hard and smooth. Unless there be ulceration accompanying it, palpation does not exhibit pain. One of the characteristic palpatory signs is the extreme mobility of the tumor, one being able to push it almost anywhere within reason. If ulceration has occurred, however, secondary adhesions may prevent this. The duration of the disease, of course, depends upon the amount of hair consumed, but it averages something like 15 years. Ulceration and perforation, or hematemesis or intestinal obstruction is the usual cause of death, but a large proportion die from exhaustion from the vomiting and diarrhea.

A Serum Specific for the Human Placenta.—In an investigation on the etiology of eclampsia Veit and Scholten had made the experiment of incorporating portions of the human placenta in the peritoneal cavity of the guinea-pig. Investigations on this subject have also lately been conducted by W. LIEPMAN (Deut. med. Woch., Dec. 18, 1902). He endeavored by the continuous injection of bits of placental villi into the abdominal cavity of rabbits to obtain a specific serum (antiserum?) in the same manner as is done in the preparation of other sera, such as spermatoxin, hemolysine, tyreotoxin, etc. Bits of placental villi freed from blood, were suspended in sterile normal salt solution and injected into the peritoneal cavity of rabbits at intervals of several days from five to eight times. Blood was abstracted a week after the last injection and the clot allowed to separate. Observations made with this serum showed that the addition of placental tissue bits caused cloudiness, whereas a sample of normal rabbit's serum remained clear. The cloudiness is usually apparent immediately or in some cases within half an hour if the specimen is placed in the incubator. Microscopical examination shows small albuminoid particles with precipitin characteristics and also intact villi with nuclei only visible after staining with hematoxylin. The relation of this serum to other substances was also investigated. With human blood only a slight hemolytic staining of the specific serum was noticed. Blood serum and tissue bits do not cause any immediate reaction, only a slight cloudiness can be noticed after prolonged incubation, and even then a distinction between this and the former reaction is plainly evident. It remains for the author to determine whether it is possible to demonstrate in this manner the presence of placental tissues in the circulation. This would prove of value in its bearing on the question of the migration of chorionic villi in pregnancy, in nephritis and eclampsia.

Bactericidal Action of the X-rays.—From experimental study of this subject, Dr. CIPOLLINO and V. MARAGLIANO (Gazz. Osped., Dec. 21, 1902) find that the X-rays have a decided bactericidal action upon micro-organisms of slight resistance, such as the cholera bacillus; but upon those endowed with greater resistance, such as the *Bacillus coli, typhosus,* and *prodigiosus,* the effect is much less marked. The authors hold it probable that with a greater intensity than that employed by them, a higher degree of bactericidal action might be obtained with the rays; and that the way for direct destruction of bacteria in infectious conditions might be opened up, by the penetration of the rays through the body tissues.

New Zealand as a Health Resort.—The value of this far-away land as a haven for rest is commented on by G. F. LYDSTON (Phil. Med. Jour., Jan. 10, 1903). New Zealand is almost as large as Great Britain and can be directly reached by steamer in three weeks. He believes that the country is not appreciated in America as it should be. The latitude is about that of France, Spain and Italy. The climate is ideal, the rainfall abundant and the soil fertile. The islands, three in number, are volcanic in origin and mountainous in their general aspect. On North Island is a belt of thermal springs about 150 miles long and 25 miles wide, consisting of innumerable geysers, hot springs, mud baths and mineral springs. There are numerous well-appointed spas and sanatoria, all under governmental control and supervision, and the rates are less than at any health resort within the author's knowledge. The mineral springs, with the exception of the sulphur, are usually saline, feebly alkaline and heavily charged with CO_2. Great claims are made for all of them in gastro-intestinal, renal and hepatic disturbances. The hot baths, at 104° to 105° F. at Hanmer, one of these resorts, can be taken with perfect freedom twice daily for half hour at a time, which is in marked contrast to our own system at the Arkansas Hot Springs, where only a 7-to-15-minute bath at 94°-98° F. is allowed. The author believes that this is one of the most wonderful countries in the world, whether viewed from the standpoint of the physician or the lover of nature.

Relations between Lymphatics and Connective Tissue.—This subject, which has been debated for many years by numerous investigators, has been studied lately by W. G. MACCALLUM (Johns Hopk. Hosp. Bull., Jan., 1903), with idea of determining the relations between the lymph-channels and the surrounding tissues. He found that the lymphatics could be readily demonstrated by interstitial injections by means of a fine hypodermic syringe in the skin of embryo pigs. It has been stated that the lymphatic channels have not complete walls, but that they are in free communication with certain ramifying spaces in the tissue through pores in their walls (Saftkanälchen of v. Recklinghausen). From the author's preparations it appears, however, that the apparent spaces are cells whose outline has been stained with nitrate of silver which is also precipitated in the material lying between them. In edema of the tissues it was also found that the lymphatic vessels were sharply outlined and could not be distinguished from the normal. It is not evident therefore that tissue spaces are in free communication with the lymphatics. Sections cut parallel to the flat surface of the skin showed no pores or holes in the walls of the lymphatic vessels. Careful injections also dem-

onstrated that a slight overdistention of the vessels caused irregular projection of bush-like tufts and by pressure of a coverslip all the injecting fluid could be pressed out of the lumena of the actual lymph channels, leaving the extravasations unchanged as a sort of blue fringe along the clear empty canals. This would not occur if these masses were in communication with that in the lymphatic by preformed channels. The anatomical evidence seems to show that the walls of the lymphatics, although delicate in the extreme and easily ruptured are still possessed of a complete endothelial lining which shows no pores or open communications with the surrounding tissues, but is practically analogous with the lining of the blood vessels.

HYGIENE.

The Misuse of Boric Acid.—In order to render boric acid really efficient as a food preservative, it is necessary to use powerful solutions. Liebreich showed that staphylococci could remain alive for ten days on a 4-per-cent. boric acid solution. W. DOSQUET-MENASSE (Berl. med. Woch., Dec. 15, 1902) found 3-per-cent. solutions useless for the preservation of meat. This writer takes issue with some of the later utterances of Liebreich, who in his earlier writings asserted again and again the danger of poisoning from the excessive use of boric acid. But aside from the question of the toxic effect of the strong solutions of boric acid now in common use, arises the question of the danger of concealing the real condition of meat in which putrefaction has actually begun. It is a safe general rule that every chemical antiseptic which is capable of destroying bacteria is bound so to alter meat as to render it less nourishing. Meat is changed for the worse even by that least harmful of all antiseptics, moist heat, provided the heat employed be of a sufficient grade and be long enough applied to destroy all bacteria. The only safe method of procedure is to abandon antisepsis in food preservation and to rely upon asepsis.

The Vaccination Controversy.—Some facts bearing on the vaccination controversy, drawn from the recent epidemic of smallpox in South Essex, are given by C. FRASER (Lancet, Dec. 20, 1902), as follows: It is necessary, at the outset, to define the terms used in the classification of the cases from their clinical standpoint, since their application is bound to be more or less arbitrary. In *mild* cases the eruption consists of a score of spots, more or less; the constitutional symptoms are slight and evanescent and rarely extend to the eruptive period. In the *discrete* type pocks are more numerous, but never touch each other. Any degree of coalescence brings the case within the *confluent* group, in which, for convenience, hemorrhagic cases are included. The following comparison of vaccinated and unvaccinated is noteworthy:

	Vaccinated.	Unvaccinated.
Mild	36 per cent.	8 per cent.
Discrete	45 per cent.	45 per cent.
Confluent	19 per cent.	47 per cent.

It will be seen that the proportion of mild cases is more than four times greater among the vaccinated than among the unvaccinated, while, on the other hand, the proportion of confluent cases in the same group is two and a half times less. The even distribution of discrete cases must, of course, be studied in the light of the case mortality of each group. In the vaccinated this is found to be 2.8 per cent., while in the unvaccinated it is 20.4 per cent. In the course of an inquiry into the reasons why patients had remained unvaccinated, one but seldom met with the story of ill-health in infancy. Unreasoning prejudice accounted for quite a considerable number of cases. Of interest, also, was an attempt to define reasons for neglect of revaccination. Procrastination played an important part, and its victims were not a few. There are still, however, persons who go about during an epidemic without being revaccinated, not for want of belief, but because of an ingenuous trust in marks many years old. If statements could be trusted, vaccination that was merely so in name, in that it proved a false sense of security, again and again proved a snare, and the proof came in the form of a very unpleasant surprise. That there is vaccination and vaccination is a fact which one would believe to be pretty widely known; but whereas, there are some persons who will point with assurance to almost invisible scars, there are others who declare that, inasmuch as vaccination of this quality has failed to protect, vaccination as a whole is an imposition. In this regard an analysis of the case mortality in regard to the efficacy of vaccination may be quoted. Owing to stress of work the recorded measurements of scars were incomplete and the number of insertions is therefore taken as the standard. There were 138 cases with one mark, with 23 deaths, or 16.6 per cent.; 144 cases with two marks, with 17 deaths or 11.1 per cent.; 214 cases with three marks with 19 deaths, or 8.8 per cent.; 361 cases with four marks, with 25 deaths, or 6.9 per cent.; and 271 cases in which the patients were unvaccinated, with 92 deaths, or 33.9 per cent. That the groups are larger in proportion to the number of insertions will doubtless suggest to the opponents of vaccination that the latter predisposes to smallpox. Patients with one, two, three or four vaccination marks were in hospital on an average of 27, 35, 33 and 32 days, respectively, the stay of the unvaccinated extended to 58 days. The early incidence of smallpox where protection has not been acquired is illustrated by the fact that of 198 persons under ten years of age attacked by smallpox, 47 or 23.7 per cent. were vaccinated and 151 or 76.3 per cent. were unvaccinated. It is hardly necessary to mention that the unvaccinated group in the first decade of life in the community is much smaller than the vaccinated. In the first decade the case mortality was but 6.3 per cent. in the vaccinated, as against 37 per cent. in the unvaccinated. In the subsequent decades the fatality percentages are, for the vaccinated 9.8 and for the unvaccinated 30 per cent. These figures are sufficiently relevant to the question of the modifying effect of the acquired resistance, even when it is below the immunity level. An analysis based on the extremes of severity of cases occurring in later decades demonstrated the gradual ebb of immunity. Thus in the second decade 44 of the vaccinated cases were returned as "mild" and 15 per cent. as "confluent." For the third decade the figures were respectively 33 and 17 per cent., and for subsequent decades 27 per cent. in both cases. The gradual loss of immunity is clearly indicated. Its retrogressive character is also clearly shown by the fatality rates in succeeding decades of ages. These work out at 6.3 per cent. for the first decade, and for subsequent decades, respectively 4.2, 8, 11.5, 19, 26 and 33 per cent. The percentage in the first decade represents three patients whose condition with regard to vaccination can only be described as eminently unsatisfactory and whose ages were respectively ten, nine and ten years old.

EYE, EAR, NOSE AND THROAT.

Permanent Hemianopsia Following Eclampsia.—Disturbances of vision are almost always accompanying symptoms of eclampsia, but compared to amaurosis, which is frequently observed in eclampsia, hemianopsia is a rare occurrence and has thus far been described

but twice. H. WOODS (Maryland Med. Jour., Nov., 1902) reports a case with permanent left hemianopsia, and in explaining the possible causes of this condition alludes to several points in the etiology of eclampsia upon which little stress has yet been laid. In a forthcoming work by Dr. Williams upon obstetrics, uremia is not accepted as the basal or chief cause of eclampsia. Several years ago it was pointed out that hemorrhagic hepatitis was frequently found in certain eclamptic cases. More recent work has shown that lesions of the liver are more frequent and more characteristic lesions than those of the kidney. These consist of reddish or whitish areas scattered throughout the liver, but particularly marked in the region of the portal vessels. They are areas of necrosis and their formation is attributed to degenerative changes following thrombotic processes in the smaller portal vessels, and they can be found in over 95 per cent. of cases. Similar changes may be found in the brain, and it is supposed that eclampsia is probably due to some as yet unknown poison circulating in the blood which may give rise to lesions of varying intensity in the different organs.

Gonorrheal Iridochoroiditis.—The systemic character of gonorrhea has been proven in many cases by the demonstration of the gonococci in the blood, especially in cases of endocarditis and arthritis complicating gonorrheal urethritis. Inflammations of the eye are perhaps not so frequent, but that an iridochoroiditis may be due to this specific infection, is undoubtedly proven. C. S. BULL (Med. Rec., Dec. 20, 1902) reports five cases in which the lesion was characteristically that of gonorrhea. Inflammation of the uveal tract, due to this cause, develops much more rapidly than the ordinary rheumatic iritis and choroiditis and the plastic character of the inflammation is less pronounced, it being rather of a serous variety. It never seems to follow the urethritis immediately, but is invariably preceded by an arthritis usually of the knee-joint. The iritis or choroiditis is distinct from the ordinary type in being sudden in its onset, very rapid in its development, accompanied by severe pain and a rapid and complete loss of vision. Though the inflammatory process is obstinate and subject to frequent relapses, it eventually subsides and usually leaves no trace behind. There is almost never any gelatinous or fibrinous exudation into the anterior chamber and the main cause for rapid and marked deterioration of vision seems to be due to a general serous infiltration of the iris and choroid and a diffuse infiltration into the aqueous and vitreous humors. Synechiæ seldom occur, and if they do, they are easily broken. When the patient incurs another attack of gonorrhea, the iritis is again liable to manifest itself, but the disappearance of the iritis under appropriate treatment without leaving synechiæ proves the absence of the plastic character, and at once distinguishes it from the usual form of serous iritis. Leeches, atropine and hot fomentations with sodium salicylate internally, and an appropriate treatment for the urethritis are usually followed by satisfactory results.

Septum Perforation in Chromic Acid Factories.—It is a well-known fact that perforations of the septum of the nose are common in those who work in factories where chromic acid and the chromates are employed. J. BAMBERGER (Münch. med. Woch., Dec. 23, 1902) draws attention to the fact that no other part of the nose except the septum is generally involved, and explains this by the direction which the inspiratory current of air takes, so that the particles of caustic will come to lie directly upon the septum and there exercise their caustic effect. As soon as the perforation has taken place, the pains and coryza disappear at once. Those who are accustomed to snuff experience less of the bad effects, since their mucous membrane is already in a state of chronic irritation, and the increased secretion tends to wash the salt away.

GENITO-URINARY AND SKIN DISEASES.

Hydrocele.—This condition is quite common, and yet not always amenable to treatment. A radical cure by incision of the sac with the aid of the thermo-cautery is described by L. CAILLERON (La Sem. Méd., Dec. 3, 1902). The patient was thoroughly anesthetized, and an incision 2½ to three inches was made in the skin over the tumor, passing through the various layers, down to the tunica vaginalis, which is easily recognizable from its bluish color and from distention by the fluid. The next steps are pointed toward enucleation of the tumor by aid of fingers and scissors, from the neighboring tunica and the elements of the cord. When this has been done the pouch is opened, and while the assistant stretches the tunica, which is loose, it is excised by the thermo-cautery, heated to a dull-red heat. Of course, there is not the least loss of blood. The testicle, thus deprived of its parietal serosa, is mopped off with sterile gauze, wet with peroxide of hydrogen, and then replaced into the scrotum. The wound is closed by five or six sutures, which penetrate all the layers of the skin and subjacent tissues, so as to compress the vessels which may have been cut in the skin wound. The pain after this operation is nil, and at the end of eight days the superficial skin sutures, which finally closed the wound, and on the tenth day the retention sutures are removed. On the twelfth to the fourteenth day, the patient may return to his duties again.

Leucoplakia.—The first report of a case of leucoplakia which eventuated in cancer was made by Neligan in 1862. To earlier writers the disease is known as ichthyosis. The occasional induration of the patches suggested the name tylosis. Leucoplakia and leucokeratosis are later terms. The literature is reviewed by F. C. COBB (Bost. Med. and Surg. Jour., Dec. 11, 1902). There are both simple and syphilitic cases of "psoriasis" and in both leucoplakia may occur. Among irritative causes tobacco is the most effective. Fournier noted that in 65 non-syphilitic cases 64 occurred in habitual smokers. Among Leloir's 35 cases all but one were smokers. It is but natural that a constitutional disease like syphilis should produce effects in the mucous membranes which should lead to formation of scar tissue. Thus 80 per cent. of Fournier's cases had syphilis. It is doubtful if syphilitic leucoplakia is of the same character pathologically as non-syphilitic, but there seems no question that either may degenerate into carcinoma. In leucoplakia there occurs marked thickening of the epidermis, under which in the submucous layer is a great infiltration of small cells around the vessels. Between these layers is a pronounced granulative layer, consisting of five or six rows of cells filled with eleidin, and a not greatly altered Malpighian layer. In the second stage fissures form, going down to the Malpighian layer, which degenerates, showing granular colloid cells and numerous wandering cells. Sangster found vacuolation of the Malpighian layer and wide lacunæ taking the place of the papillæ. The thickening of the submucous layer is evidence of a more or less chronic process, while its infiltration by round cells suggests acute conditions or the exacerbation of chronic ones. Evidence as to treatment is conflicting. Cases treated by excision, papayotin, cautery, alkaline washes, and "let alone"—all are credited with successful results. On the other hand, many leucoplakias develop carcinoma despite all treatment. Among 10 cases at the Massachusetts General Hospital four developed carcinoma.

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THE BACILLUS OF DIARRHEA AND DYSENTERY.

IN view of the interest in the etiology of acute dysentery which has been recently aroused by the work of Shiga in Japan, Flexner in the Philippines and the United States, and Kruse in Germany, the paper in this issue of the MEDICAL NEWS, by Drs. Hiss and Russell, on an organism isolated from a case of enterocolitis, is of special importance.

Since in the determination of the etiological relationships of micro-organisms to disease processes many questions of broad practical significance, especially those relating to serum diagnosis and serum therapy, are involved, this paper should be studied by the clinician as well as the bacteriologist. Drs. Hiss and Russell isolated from the stools of a fatal case of diarrhea a bacillus which without the most careful study by experienced workers would have been reported as Shiga's organism. They were, in fact, only able to distinguish this organism by a difference in the acid production when grown in the presence of various sugars not commonly used in identifying bacteria. They believe that a description of their bacillus—apart from its connection with the case of dysentery, which may or may not be etiological—is of much importance, particularly since its agglutination in the true dysenteric serum, a test too often relied upon for the identification of an organism, might readily lead to its being confounded with the Shiga bacillus. Furthermore, these investigators suggest, and correctly, that subsequent use of a similar organism might give rise not only to confusion in determining the specific character of the disease, but to untoward results in the application of serum therapy. The determination of fixed differences in the fermentation of the various sugars by organisms heretofore considered identical—as shown by a comparison of Shiga's bacillus, Kruse's bacillus, Flexner's Manila culture, Strong's Manila culture and other organisms isolated in this country—demonstrates the fallacy in previous methods and obviously points out the necessity of a careful study along these lines of all organisms resembling the Shiga bacillus before the relationship of these organisms to the various forms of enterocolitis as known clinically and pathologically can be accurately determined and be of practical significance. It is more than probable that some cases have been wrongly attributed to the Shiga bacillus, and it may well be that too wide a distribution and significance has been given the true Shiga organism.

In addition to the uncertainty that has attended the use of curative sera in patients with typhoid, dysenteric and similar infections in general there arises from this work the question whether the homologous serum, viz., that secured from animals immunized against the bacillus—which is the excitant of the disease in the patient—was used in the cases reported to have been benefited or not benefited. The fact that these bacilli are so closely related in their agglutinating reactions complicates the making of accurate early diagnosis, but this will doubtless be obviated by bacterial examination of the stools. In the event of serum therapy proving an efficient means of treating dysenteric infections, the determination of the bacterial excitant in each case is obviously of paramount importance, unless it should be found that for practical purposes the curative sera were interchangeable.

THE NUCLEINS IN THERAPEUTICS.

NUCLEINS are now employed therapeutically in many forms and in numerous diseases, and there is rational foundation for their use. The physiological rôle of these substances is certainly an important one, and the therapeutic application of nucleinic compounds has for its object the direct supply to the human organism, in assimilable

form, of substances which ordinarily are acquired indirectly through the medium of the circulating leucocytes. The biological and chemical facts relating to this subject are well stated in a recent communication by A. Martinet (*La Presse Méd.*, Dec. 20, 1902).

The rôle of the white blood cells in the assimilation of nutritive substances was long ago established; more recently experiments have been made which show the singular and important function of these cells in the absorption and modification of medicaments. In 1880 Selmi observed that when a non-fatal dose of arsenious acid is given to an animal, a large part of the arsenic passes into the organism in the form of an organic compound and is excreted in that form in the urine; at the same time there appears in the urine an excess of phosphorus in the form of an organic base. Arsenic evidently takes the place of phosphorus in organic combination. Besredka showed that when arsenic is introduced subcutaneously, whether in soluble or insoluble form, it is absorbed by the leucocytes exclusively, while not a trace can be found in the other elements of the blood. The arsenic taken up by the leucocytes passes into nucleinic combination and in this form reaches the nuclei of the cells of the nervous tissues. The saving quality of the intermediation of the leucocytes is shown by the fact that if arsenic be placed directly in contact with the nervous centers, it is found to be one hundred times more poisonous than when injected subcutaneously and absorbed and modified by the white blood cells.

According to an early generalization of Claude Bernard the cytoplasm of cells is the seat of the phenomena of disintegration or vital expenditure, while the cell nucleus is the center of organic synthesis—the agent of the conservation of vital energy. Both leucocytes and the nuclei of fixed cells—the former important for defense and assimilation, the latter important in synthetic processes—are composed principally of nucleïns. Of the solid part of leucocytes, nucleins constitute 78 parts per 100; and they are found well represented in the cells of the liver, the spleen, the lungs, the testes, the ovaries, the nervous tissues and the thymus, predominating everywhere as agents of growth, of development, of reproduction.

The chemical study of the nucleins is clearly of capital importance. It is impossible here to restate fully the opinions of Miescher, Altmann and others. Suffice it to say that analysis shows that nucleins consist of an albumin more or less lightly combined with nucleic acid, the latter being very rich in phosphorus. For a study of metallic combinations with nucleic acid we are indebted to Schwickerath, who, working with nucleic acid derived from yeast, obtained combinations by gradually adding a fresh solution of metallic oxide to a slightly alkalinized aqueous solution of the acid. The addition of an excess of alcohol to such a preparation yields a voluminous precipitate of nucleic acid chemically combined with mercury, silver, copper or iron, as the case may be—substances to which Schwickerath gives the generic names mercurol, argol, cuprol, ferrinol. Kossel has found among the products of decomposition of nucleic acid members of the pyramidin series (pyramidin, thymin, xanthin, hypoxanthin, adenin, guanin). This may perhaps explain the increased elimination of uric acid which follows the ingestion of substances rich in nucleins, inasmuch as there is a close chemical relationship between uric acid and members of the pyramidin series, xanthin and hypoxanthin in particular.

Among current remedies, glycero-phosphates and lecithin may be classed as essentially nucleinic. The use of organic preparations of arsenic is in harmony with what is now known of the action of leucocytes, rich in nuclein, upon inorganic preparations of arsenic. It is highly probable, according to Hartung, that iron is transformed by the leucocytes into ferruginous nucleinic combinations before it can be utilized by the organism. Blood serum, freed from corpuscular elements, is bactericidal owing to the nuclein which it contains, Hahn's experiments showed that the germicidal power of serum can be largely increased by the administration of yeast nuclein. The value of beer yeast in the treatment of sepsis due to staphylococcus, is explained by the wealth of nuclein which beer yeast contains. Vaughan reports that in tuberculosis moderate injections of nuclein cause a fall of temperature, and Aulde recommends nuclein in anemia, digestive disorders and in acute and chronic pulmonary affections. Aulde also suggests that nuclein may be useful in typhoid fever, in which disease the activity of the leucocytes is diminished. While the indications for the employment of nucleins are not thoroughly clear, knowledge of their physiological rôle suggests the conditions in which they can best be utilized, and evidence of their value in such conditions is rapidly accumulating.

MEDICAL LEGISLATION AND THE FEMALE.

THE following idiotic bill has been introduced into the Assembly of the State of New York. Its provisions we give entire:

AN ACT relating to the treatment and care of female patients in hospitals and elsewhere, and for the protection of the honor and morality of such patients.

The people of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. That it shall be unlawful for any student, attendant, house physician and surgeon, or anyone else, to expose the body or person of any female patient, in any hospital, medical college or elsewhere, in the State of New York, for any purpose other than the performing of an operation necessary for the recovery, or relief from pain, of said female patient.

Sec. 2. That when it shall be deemed necessary for such operation to be performed, the parents and sisters and brothers, or such of them as shall be living, or in case none shall be living, the guardian or next friend designated by such patient shall be notified at least twenty-four hours before the performing of such operation, and at least three of such persons so notified shall be allowed to be present in the operating room, during the entire performance of such operation, and until said patient shall be removed from said operating room and replaced in her bed until she recovers her sense; except, when in case of accident the notification herein required may be dispensed with, if an immediate operation shall be deemed necessary by the authorities in such hospital or medical college. In case such notification shall be dispensed with no person or persons other than immediate relatives or guardians or next friend of such female patient so to be operated upon, shall be permitted to witness such operation or any part thereof.

Sec. 3. Any person or persons convicted of performing, or attempting to perform, or who aid by their presence or otherwise in the performing of an operation upon a female patient, except as permitted herein, shall be deemed guilty of a felony, and the punishment thereof shall be by a fine of not less than one hundred dollars and not more than five hundred dollars, or by confinement in a county jail or State prison for a term not less than one year and not more than five years, or by both such fine and imprisonment.

Sec. 4. This act shall take effect immediately.

Comment on this is unnecessary.

ECHOES AND NEWS.

NEW YORK.

New Superintendent for Mt. Sinai Hospital.—Dr. S. S. Goldwater has this week been appointed Superintendent of Mt. Sinai Hospital. His duties begin April 1.

St. Mary's Free Hospital.—The recent opening of the new parts of St. Mary's Free Hospital for Children marks an added development in the hospital system of our city. Beginning 31 years ago with a small dwelling house which was rented from year to year, this institution has grown until it now has 100 beds and an ideal equipment. The hospital plot abuts on Thirty-fourth Street, Thirty-fifth Street and Ninth Avenue. In 1900 a model of one of the wards was sent to the Paris exposition and a gold medal was accorded to it, and since that time through a bequest which was received from the late Mr. Charles A. Contoit, additions have been made to the Hospital on the same basis of construction and the older parts of the building reconstructed so as to harmonize with the newer parts. We wish every success to this excellent institution which is doing so much to give health and comfort to the children of the poor.

The New Rockefeller Institute for Preventive Medicine.—The location of the new Rockefeller Laboratory, accounts of which have appeared in the news recently, will be the three blocks from Sixty-fourth to Sixty-seventh Street, Avenue A to the East River. This is a portion of the famous old Schermerhorn farm, which was purchased by Peter Schermerhorn (known to genealogists as Peter the Younger) in the early part of this century. The streets, Sixty-fifth, Sixty-sixth and Sixty-seventh, though officially upon the city map, have never been opened. The city has not taken title to the land, and there will probably be little difficulty in arranging with the city for the transfer of jurisdiction to the trustees of the proposed institution. The new laboratory grounds, therefore, according to present plans, will cover three city blocks, though none of the building details are forthcoming. The price paid for the land is in the neighborhood of $700,000. The size of the plot indicates in a measure the magnitude of the enterprise Mr. Rockefeller has in view. The property is admirably adapted for its intended use, lying as it does high above the water opposite Blackwell's Island, at a point directly north of the new Blackwell's Island bridge piers, and commanding a fine outlook up and down the river. It is said that work upon the new buildings will be begun about the first of May.

Bellevue Alumni.—The fiftieth anniversary of this society was held Feb. 4, and was a delightful occasion. The following, with a magnificent silver service, was presented to Dr. Gouley:

DOCTOR GOULEY.

By Poet Laureate Dr. R. K. *Air:—Mr. Dooley.*

There is a man that's known to all, a man of great renown,
A man whose name is on the lips of many a man in town,
They speak about him every day, you've heard his name no doubt,
And if he ever sneezes, they will get an Extra out.

Chorus:

For Doctor Gouley, for Doctor Gouley,
The smartest surgeon this land ever knew,
Always proficient, ever efficient, is
Doctor Gouley-oo-ley-oo-ley-oo.

See him at the Hospital with bright and earnest face,
Explaining to the House Staff the aspects of each case,
His patients never can forget, nor will they ever rue,
The way he used to treat them in the wards of old Bellevue.

Chorus.

And at his operations with verbiage exact,
He lectures to the students on surgery in fact,
The way he cuts for Calculi and removes them by the score,
Makes every patient wish he had, at least one dozen more.

Chorus.

Kings County Medical Association.—At its recent meeting Feb. 10, Dr. Arthur C. Brush read a paper on the Etiology of Tabes.

The Society of Medical Jurisprudence.—The One hundred and seventy-first regular meeting was held Monday, Feb. 9. The paper of the evening was entitled Adulteration of Drugs and Laws Relating Thereto, and was read by Prof. H. W. Wiley, Chief of the Division of Chemistry, U. S. Department of Agriculture, Washington, D. C.

PHILADELPHIA.

University of Pennsylvania.—Dr. S. Weir Mitchell will deliver an oration Feb. 21 at the Academy of Music of Philadelphia on "George Washington In His Letters."

Medical Instruction to Railroad Employees.—Authorities of the Jefferson Medical College have offered the various railroads entering Philadelphia a free course of training to their employes in first aid to the injured. Railroad officials have taken kindly to the suggestion and it is probable that a course of lectures by the staff of the College will be given to trainmen.

Phipps Institute Opened.—The temporary quarters of the Phipps Institute for the treatment of tuberculosis was opened on Monday, February 9. Improvements are yet incomplete, but about 30 cases registered for treatment. The dispensary will be open each day from 11 to 12 A.M. Within two weeks the Institute will be thoroughly equipped and the work well under way. Under Dr. Lawrence F. Flick, as Director, are Drs. Joseph Walsh, A. H. Hatfield, and J. Willoughby Irwin as assistants.

Congenital Cyanosis.—This case was exhibited by Dr. Joseph Sailer. The patient is a girl of twelve years, the cyanosis being first noticed at the age of four. She is a fairly well developed girl. The gums bleed easily, and dyspnea is present as is also frontal headache. The lips, end of nose, and tips of fingers are bluish, the mucous membranes are dark purple. The extremities are cold and there is clubbing of the fingers and toes. Heart sounds give no definite clue to lesion of that organ. The radial pulses are strong, equal, and rhythmical. Blood counts show 8,875,000 erythrocytes, and over 100 per cent. of hemoglobin. Skiagraphs of the chest show that the heart is moderately enlarged both to the right and left and on the right side apparently reaches to the level of the first rib.

Case of Possible Splenomegaly.—Dr. A. A. Eshner exhibited this patient at the meeting of the Section on Medicine of the College of Physicians Feb. 9. He is a laborer in a tannery, nineteen years of age and an alcoholic. His history is that of recurring abdominal pain, chills, fever and jaundice. The spleen and liver are markedly enlarged. No palpable glands are affected. Hemoglobin and erythrocytes are reduced, as are also the leukocytes. Malarial organisms were found in the blood but disappeared under hypodermic injections of quinine. The case is thought to be possibly one of hypertrophic cirrhosis with splenomegaly due to the use of alcohol. The case may be summed up as one with enlargement of the spleen and liver and some of the symptoms of splenic anemia. Dr. J. A. Scott said the cause of the condition was not clear as two factors had to be considered, first, repeated malarial infections, and second, alcoholic debauches twice a week for at least three years. He would attribute it to a mixed cause, the enlargement of the organs being due to alcohol and the present tenderness due to the repeated infections.

Cause of Polycythemia in Cases of Congenital Cyanosis.—Dr. H. A. Hare asked for an explanation of the polycythemia and high color index in these cases, mentioning the theory advanced by some writers that it was due to the effort of nature to thus supply the tissues with oxygen. In reply Dr. Alfred Stengel said that this theory of the intention of nature to furnish oxygen by producing more corpuscles he considered to be on the same basis as the opposite one of explaining the condition of an increased length of life of the red corpuscles. Both are mere speculations. He believes the high count is caused by centrifugalization of the blood. The count from the toes of such persons is often 15 per cent. higher than from the finger when raised as high as possible. The corpuscles are held in the tissues of the parts and the plasma goes on. The condition is analogous to that found when the extremities have become chilled. When a healthy person's hands are cold the blood count may show 6,000,000 red cells when 4,000,000 is the normal number for the individual. This emphasizes the point that blood counts are only of relative value. As to the lesion in the case under discussion Dr. Stengel said that of the cases of congenital cyanosis accompanied by heart disease that lived to the age of fourteen or more, 90 per cent. had pulmonary stenosis. This case did not show signs of that lesion and he considered it one of patent septum ventriculi.

Bilateral Bony Anchylosis of the Temporo-Maxillary Articulation of Traumatic Origin and Its Surgical Treatment.—At the Philadelphia Academy of Surgery, Feb. 2, Dr. W. J. Roe, by invitation, read a paper upon the above subject and presented two cases upon whom he had recently operated. The condition is believed to be always the result of a fracture into the joint and may therefore be looked upon as a sequel to that injury. Both patients shown were about eighteen years of age. The first had bilateral anchylosis as a result of catching his chin on a wire fence when coasting at the age of eight. Several attempts had been made under ether, to break up the anchylosis, none meeting with success. The mandible was small and there was marked fulness over the articulations. Operation was performed on one side at a time, with an interval of one week between. A mass of callus, the condyle and the neck of the mandible were excised. There was no bone between the articular surfaces but a bridge of bone extended between the mandible and zygoma. There was no trouble with breathing when the second anchylosis was divided and the jaws separated. The patient now can open his mouth a distance of one and one-fourth inches and has considerable lateral motion.

Respiratory Embarrassment When Mandible Is Loosened.—The second patient received his injury

by falling 14 feet, striking his mouth, when five years old. There was the same recession of the chin and fulness over the articulations as seen in the preceding case. The operation was practically the same as the first and almost exactly the same condition of the parts was found. Some difficulty in respiration ensued and when the jaw was loosened this became marked. Efforts at restoration of breathing became urgent and finally a quick laryngotomy was performed. One hour afterward the wound was closed. The jaw was forcibly opened only half way at this time because of the respiratory difficulty. The results are practically as good in the last as in the first case, considering the time that has elapsed after each. The latter patient can now open his mouth one inch and has but slight lateral motion. The question of asphyxiation is an interesting one as the two patients were of the same age and physical condition, and the same precautions and technic were used in each. Dr. Roe believes that asphyxiation in these cases depends on the mechanical conditions present. The abnormal position of the tongue and larynx will be more marked the earlier the mandible is injured. The three years difference in the age of the patients at the time of injury made considerable difference in the position of the parts, the hyoid bone and attachments being displaced downward and backward. To prevent the complication in question, operate soon after injury in children, anchylosis occurring after the patient has reached maturity not giving rise to this abnormal configuration of the parts. The clinical history of the patients if carefully elicited may help the surgeon anticipate respiratory difficulty at operation. In the case under consideration, the patient had been accustomed to sleep with his head well extended and in addition snored very loudly. Asphyxiation should be treated by restoring the mandible to its former position, lifting the hyoid bone from the pharyngeal wall by means of a tenaculum, or as a last resort, do tracheotomy. To avoid this complication do not separate the jaws by means of a mouth gag when the last anchylosis has been divided. Sufficient stretching of the parts can be secured without its use, which may be quickly followed by asphyxiation.

Etiology and Treatment of Bony Anchylosis.—Dr. Roe considers these two cases of value as illustrating the true etiology of the condition in question. There is a fracture of the neck of the mandible and consequent slow denudation of the periosteum of the zygoma. Anchylosis between the bones then results. A misleading symptom in these cases is a slight mobility of the mandible. In the first case the incisor teeth could be separated one-tenth cm. and in the second case three-tenths cm. This movement is due to the springing of the bone and does not signify a movable joint. Dr. Roe prefers to operate on one side only at a time, taking the worst side first. This is believed to materially lessen the danger of infection which is apt to occur in one side while the other is being operated upon. The final result will depend largely upon the condition of the muscles of the parts, hence they should be injured as little as possible. The new formation of bone after operation is to be little feared. Anchylosis after fracture is best prevented by the use of an interdental splint.

CHICAGO.

Annual Report of the Alexian Brothers' Hospital.—The Alexian brothers' annual report of the work of their hospital at Belden and Racine avenues shows much charitable work has been done. In 1902, 2,981 patients were nursed in the hospital, 1,912 being dismissed as cured. Of the 305 who died, 122 were taken to the hospital in a dying condition. Of all the patients treated 1,681 paid the fees, 397 paid according to their means, and 903 were nursed free. City ambulances took 693 accident victims to the institution. According to religious profession 1,610 patients were Catholic, 1,172 Protestant, 54 Jewish, and 145 professed to no particular creed. Of the total number 1,764 were single men, 833 married, and 384 widowers. The nationality of the patients varied greatly, 961 being Americans, 8 Armenians, 56 Austrians, 6 Belgians, 10 Bohemians, 43 Canadians, 3 Cubans, 41 Englishmen, 4 Frenchmen, 141 Greeks, 889 Germans, 6 Hollanders, 3 Hungarians, 293 Irishmen, 34 Italians, 151 Poles, 18 Russians, 225 Swedes and Norwegians, 13 Scotchmen, 2 Spaniards, and 66 Swiss. The brothers wish to express their gratitude to the doctors of the medical and surgical staffs and to all benefactors.

Case of Inversion of the Uterus of Sixteen Months' Standing; Replacement by Anterior Colpotomy and Anterior Uterotomy, with Recovery.—Dr. Reuben Peterson, of Ann Arbor, Mich., read a paper on this subject before a recent meeting of the Chicago Gynecological Society. The patient was an American, aged twenty-six, and married three years. Her family and personal histories were negative. Her menstruation first appeared at the age of twelve, and up to the time of her present trouble was entirely normal. Her first confinement occurred about fifteen months before her entrance to the hospital. It was an easy labor, and was terminated by forceps, the instruments being applied only about five minutes. The patient did not remember about the delivery of the placenta and felt nothing give way. She flowed very profusely and was given presumably ergot. She stopped flowing soon after the completion of labor, and there was no further hemorrhage until the seventeenth day, at which time she had been up and about the room for a week. Two weeks later she consulted her physician, who told her there was something wrong with the uterus. He made a number of unsuccessful attempts "to fix it." Dr. Peterson saw the patient soon after this. Vaginal examination disclosed a typical inverted uterus, with rather a small fundus, situated about one and a half inches within the introitus. High up in the vagina could be felt the cervical lips, forming a complete collar or rim at the extremity of the uterus. The inverted uterus was grasped with the volsella and pulled forcibly outward and downward. Another volsella caught the anterior vaginal mucosa in the median line just above the anterior lip of the cup and pulled it sharply upward. Through the vaginal mucosa thus made tense, a horizontal incision was made some two and a half inches in length. To avoid opening the bladder, the incision was made as close to the cervix as possible. The vesico-uterine peritoneum was opened, and the cervix exposed. A volsella was placed on the anterior lip to either side of the median line, and the cervix incised between. This incision was carried upward in the anterior median line of the uterus to within one-third inch of the fundus. The inversion was now easily reduced, the fundus going upward and each half of the divided cervix being carried through half the arc of a circle and finally meeting, so that the two halves formed a complete cervix situated downward, not upward. He now adopted the suggestion of Taylor, and removed a wedge-shaped piece of the bulging uterine wall on either side of the incision. This was

done to enable the retracted edges to come together. The uterine incision was next closed by a continuous catgut suture. The needle was passed from the peritoneal surface down to, but not through, the uterine mucosa. There was some gaping in one or two places, in spite of the utmost care to bring together the peritoneal edges. An unsuccessful attempt was made to close in the spaces by interrupted sutures, but the stitches tore through the uterine wall when much tension was placed upon them. A catgut suture was passed around each round ligament close to the uterus, and each end passed through the anterior vaginal wall and tied, after the fundus was returned within the pelvic cavity. This brought the defectively sutured line of incision up against the bladder peritoneum, at the same time giving support to a fundus which had been prolapsed for months. A small strip of gauze was placed to the left of the median line between bladder and uterus, and another small gauze drain was left in the uterine cavity. The lateral vaginal incisions were brought together about the cervix after the peritoneum was sutured to the uterus, except about the opening, where the gauze drain protruded. The most interesting feature of the case was the sudden rise of temperature and pulse within twenty-four hours after the completion of the operation. Was this due to a sudden absorption of necrotic material from the replaced uterine mucosa? Or was it due to leakage into the pelvic cavity through the imperfectly sutured uterine incision? The author thinks the first supposition is the correct one. The symptoms were typical of a sapremia, and the condition of the patient was at no time dangerous. It was too soon for septicemic symptoms to develop from a leakage through the uterine incision. If the rise in temperature was due to absorption of leakage, improved technique in the form of removal of a larger wedge-shaped piece would remedy this defect. Vaginal fixation of the round ligaments, he believes, is an improvement over the ordinary technic of the operation. It prolongs the operation only a few minutes, and effectively holds upward and forward the relaxed fundus, and acts as a splint to the uterine incision by holding the latter against the bladder peritoneum.

Prostatectomy: Its Indications and Technic.—Dr. G. Frank Lydston read a paper on this subject before a recent meeting of the Chicago Medical Society.

After speaking of the preparation of the patient, the author says that when the patient is placed upon the table for operation, the surgeon should understand that the correct method of operating will be governed largely by the character of the tumors. It is well to advise the patient before operating of the possible necessity of operating suprapubically.

The exigencies of the case may, in exceptional instances, be indicated by the preliminary use of the cystoscope. While this instrument adds to the accuracy of diagnosis, its use simply enhances the dangers of subsequent radical operations through the shock, traumatism and sepsis incidental to the exploration. In many cases of prostatic disease, in which a radical operation is absolutely necessary, the chief danger to the patient is from shock, acting reflexly upon the kidneys, to which is added the further danger of anesthesia. The patient should be prepared with a view to doing, not only perineal prostatectomy, but suprapubic section, if necessary. Shaving and antisepsis should be scrupulously carried out. Chloroform should be the anesthetic of election. The patient being placed in the lithotomy position, a medium-sized sound is introduced into the bladder and given into the hand of the assistant. An inverted Y-shaped incision is made in the perineum, the longer arm of the Y corresponding with the median raphe of the perineum, and the short arms traversing the region just in front of the anus. It is sometimes advantageous to make the lower incision curvilinear instead of Y-shaped. The length of the lower arms of the incision, or of the crescent, as the case may be, should be modified by the conformation of the perineum, which should be longer as the perineum is shorter, deeper and more fatty. The triangular flaps involved in the incisions should embrace all the tissues down to the muscular structure of the urethra. The triangular flaps, having been dissected up cleanly, so as to expose the outlines of the urethra clearly, should be everted and fastened to either buttock by a single strand of medium-sized silk traversing its free angle. Careful blunt dissection downward along the urethra to the apex of the prostate must now be made, the rectum and the tissues in the ischio-rectal fossa being pulled down strongly by a retractor in the hands of an assistant. If sufficient room cannot be obtained in this way, it can be increased greatly by resecting the coccyx. As the dissection is being made, the assistant, using the sound as a lever, its convexity being directed perineumward, pries the prostate down into the wound as much as possible. Where the prostatic tumors are of moderate size and quite circumscribed, it is sometimes possible to enucleate them without opening the urethra. It is sometimes advisable to do this, unless the condition of the bladder be such as to positively demand drainage or intravesical work. Even here a retained catheter may be better than a perineal drain. Where a single prostatic tumor exists on one or the other side, an attempt should be made to enucleate it without opening the urethra, unless there be some positive indication for the latter procedure. A free incision in the capsule of the prostate is rarely necessary. The author finds that the best plan is to make a puncture with a pair of strong scissors. The puncture is enlarged by opening the blades of the scissors; the dilating finger of the operator does the rest. In some instances an incision of this kind should be made upon either side. Where opening the urethra seems advisable or unavoidable, the prostatic retractor shown by the author will be found exceedingly useful. An opening is made upon the staff at the apex of the prostate. Through this incision the prostatic urethra and neck of the bladder are thoroughly dilated with the finger so far as may be. The prostatic retractor is now inserted closed, and under the guidance of the index finger in the bladder opened in such a manner that its convexity rests upon the lower segment of the bladder. The sound is, of course, removed before the neck of the bladder is dilated, and the retractor inserted. An intelligent assistant has now command of the situation. The slim wire shank of the instrument, while it is a guide, in a certain sense, to the enucleating finger, does not encroach by its bulk upon the field of operation. In some cases it is found impossible to pass a rigid staff into the bladder. Under such circumstances, one of two procedures may be resorted to: (1) A gum elastic catheter may be passed as a guide; (2) the urethra may be opened in the apex of the prostate upon a staff which can be readily passed down to this point. In enucleating the prostatic overgrowth, it should be remembered that in some instances damage may be done by overzealousness in the attempt

to remove all the adventitious tissue. No circumscribed overgrowth should be spared, but it should be understood that there is more or less diffuse tissue hyperplasia surrounding the tumors proper, and secondary to them, which it is both dangerous and unnecessary to remove, as it shrinks down readily when once the offending tissue has been extirpated. All distinct intumescences should be removed. Where enucleation is not practicable, morcellement with cutting forceps is required. He emphasized the fact that in any instance in which the tumors are removed by incisions from the mucous side, either through the urethra or bladder, the ideal perineal operation is distinctly debarred, and the operation reduced to the same plane, essentially, as that occupied by suprapubic cystotomy and intravesical extirpation of the prostatic overgrowths. Where the tumors are more or less polypoid in character, or, if sessile, are situated very high up, their bulk being distinctly intravesical, it is occasionally necessary to combine suprapubic cystotomy with the perineal method, and remove the tumors under consideration from above.

Syphilis.—Dr. Max Heichmann presented a boy, ten years of age, who, according to the history given by the mother, at the beginning of October, 1902, showed an ulcer in the left angle of the mouth. This was followed by an extensive swelling of the submaxillary gland of the same side, and six weeks afterwards by sore throat. The boy was treated at the Cook County Hospital for two weeks, after which he left the institution. Then an eruption on the forehead began to manifest itself. No other skin manifestation was noticed previously or afterwards. There are five other children in the family, but the existence of a similar affection is denied by the mother. Questions relating to tuberculosis and other diseases were answered in the negative. The mother suspects that the boy may have contracted the ulcer in the angle of his mouth from another child, inasmuch as it is the habit among the children in the neighborhood where she lives to chew on the same piece of candy. In the left angle of the mouth, the seat of the former ulcer, a scar is visible. Large cervical glands can be felt on the anterior upper part of the neck. Chains of small and large glands in the cervico-occipital region can also be felt. There is no other glandular enlargement which can be detected. The skin of the body, with the exception of that of the forehead, shows no lesions. The mouth is free; the left tonsil shows a whitish-gray cloudy hue. On the forehead is an irregular distribution of ham-colored, slightly elevated, papules of lentil size, which show upon their surface an accumulation of fine scales. No itching is complained of. The author bases his diagnosis upon the following facts: (1) The ulcer in the angle of the mouth, followed by indolent great enlargement of the submaxillary gland on the same side; (2) sore throat; (3) still persisting indolent enlarged glands of the cervical region; (4) the appearance of the left tonsil; (5) the character of the eruption on the forehead.

CANADA.

Vaccination in Montreal.—Montreal is slow to pass a by-law providing for compulsory vaccination in that city. At a meeting of the City Council held Feb. 2, a letter was read from the secretary of the Quebec Provincial Board of Health to the effect that unless the City Council of Montreal hurried up and passed a by-law for compulsory vaccination that the Provincial Board would be compelled to take steps to provide for same under the authority of the Provincial Statutes. When the letter was about to be referred to the Hygiene Committee, Alderman Ames, the chairman of that committee, informed the Council that that body had already recommended a by-law. After this the letter was contemptuously tabled.

The Medical Mission to Labrador.—After an absence of two years, Dr. Wilfred T. Grenfell, the Medical Superintendent of the medical mission to Deep Sea Fishermen in Labrador and on the coasts of Newfoundland, is again in Montreal and Toronto, lecturing on his work in that isolated portion of the Dominion and appealing for funds to prosecute it more successfully. This mission, which is of a purely medical character, seeking to reach those cases of sickness which cannot possibly be reached by any regular practitioner of medicine, was inaugurated in 1892 by English philanthropists. In that year 900 patients were treated; last year the number attended reached 2,774. Dr. Grenfell is assisted by two doctors and two trained nurses in his work. There are three hospitals located in different settlements which have twenty-four endowed cots. In addition to this there are two hospital ships to ply along a coast line some 1,500 miles in extent. One of these was donated by Lord Strathcona and the other by a lady of Toronto. The population of the mission is 30,000. Last year it cost $20,000, of which amount $2,000 was contributed by Canadians.

The Tuberculosis Campaign in Montreal.—The Montreal League for the Prevention of Tuberculosis met last week and appointed a special committee to arrange a scheme of campaign. Dr. A. J. Richer and Dr. A. G. Adami will serve on this committee. The following are the officers of the league: President, Senator George A. Drummond; Vice-Presidents, Sir William Hingston and Dr. E. P. Lachapelle. Dr. J. George Adami was named as chairman of the Executive Committee.

McGill Students in New York.—The New York Graduates Society of McGill University, held a meeting on the evening of the 30th ult., when the following officers were elected for the ensuing year: President, Dr. Wolfred Nelson; First Vice-President, Dr. James Albert Meek; Second Vice-President, Dr. Hiram N. Vineberg; Secretary, Mr. R. A. Gunn. On the same day there was organized in New York, the University of Toronto Club under the presidency of Mr. George H. Ling of Columbia University. President Loudon of Toronto University was present at the banquet held in the evening. The McGill graduates in Chicago and the West have formed a society in that city with Dr. St. John as president. A big rally of the sons of McGill will be made in Montreal in 1904, the occasion being the celebration of the seventy-fifth anniversary of the founding of McGill.

GENERAL.

American Medico-Psychological Association.—In accordance with a resolution passed at the Richmond meeting in 1900, the American Medico-Psychological Association has become affiliated with the Congress of American Physicians and Surgeons, and is now a constituent member of that body. Under the by-laws of the Congress it is required to hold a meeting every third year in Washington. This being the year for such meeting, the council has instructed the secretary to announce that the Association will meet in Washington instead of Providence. The dates for the Congress are May 12, 13, and 14, and our Association will continue in session on the

15th. Members of the American Medico-Psychological Association will receive programs from the general Secretary and announcements from the Committee of Arrangements of the Congress. The profit and pleasure of the meeting will be very much enhanced by the new affiliation. Sessions of this Association will be so arranged as not to conflict with the program for the general meeting. Some of the titles sent are as follows: Treatment of Morphine Habits by Hyoscine, by Dr. J. M. Buchanan; Report of a Case of Cerebral Lues, by Dr. J. E. Courtney; Dementia Precox, by Dr. A. R. Defendorf; Report of a Case: Was He a Paranoiac? by Dr. C. A. Drew; The Toxemic Basis of Certain Brain Diseases, by Dr. W. E. Dold; Some Observations on the Insane: Blood Pressure, by Dr. W. R. Dunton, Jr.; Blood Conditions of the Insane, by Dr. H. C. Eyman; Psychology of Epilepsy, by Dr. Everett Flood; Delusions, Hallucinations, and Illusions of the Pudic Nerve, Cerebrospinal Areas, by Dr. C. H. Hughes; An Epidemic of Typhoid Fever Due to Impure Ice, by Dr. R. H. Hutchings; The Physiological Demands in Hospital Food Supply, by Dr. W. H. Kidder; Insanity in the Negro, by Dr. J. F. Miller; Paranoid Dementia, by Dr. C. W. Page; Drill for Patients, by Dr. G. A. Smith; How Dr. Brigham Met the Challenge to Diagnose Insanity at Sight, by Dr. Stephen Smith; Pathology of Acute Delirium, by Dr. H. A. Tomlinson; The Paranoiic Forms of Manic-depressive Insanity, by Aug. Hoch, M.D.

A symposium on the subject of Trauma and insanity is contemplated. Papers are also promised by Dr. H. E. Allison, Dr. G. A. Blumer, Dr. A. E. Brownrigg, Dr. H. C. Baldwin, Dr. L. L. Bryant, Dr. Edward Cowles, Dr. J. B. Chapin, Dr. E. P. Chagnon, Dr. Edward French, Dr. G. H. Hill, Dr. Robert B. Lamb, Dr. P. L. Murphy, Dr. I. H. Neff, Dr. A. B. Richardson, Dr. B. T. Sanborn, Dr. W. P. Spratling, Dr. C. G. Wagner.

Medical Society of the Missouri Valley.—The spring meeting of this association will be held in Council Bluffs, Iowa, on Thursday and Friday, March 19 and 20. The membership of this society includes the representative men of Iowa, Nebraska, Missouri, Kansas, North and South Dakota, and the meetings are always interesting and profitable to those who attend. A feature of the first day's session will be a symposium on Syphilis, and on the second day a symposium on Typhoid Fever will be presented. The following papers have been promised: Hereditary Syphilis, R. C. Moore, Omaha, Neb. Syphilitic Immunity; or Second Infection, A. C. Stokes, Omaha, Neb. Syphilis as Affecting the Nervous System, F. E. Coulter, Omaha, Neb. Congenital Syphilis in the Newborn and Young Infants, Mary Strong, Omaha, Neb. Affections of the Eye Due to Syphilis, W. B. Lemere, Omaha. Treatment for Relief of Nasal Reflexes, with Report of Cases, F. W. Dean, Council Bluffs. A Study of a Case of Dual Personality, S. Grover Burnett, Kansas City, Mo. Embryology, Histology and Pathology of the Eye (illustrated), Flavel B. Tiffany, Kansas City, Mo. Report of Uses of X-ray in Chronic Eczema, Acne, Cancer, etc., W. L. Kenney, St. Joseph, Mo. The Psychologic Factor in Medicine and Its Application to Nervous Diseases, John Punton, Kansas City, Mo. A Few Cases of Loss of Cornea from Neglected Dacryocystitis, D. C. Bryant, Omaha, Neb. Orthopedic Surgery, Bloodless, Non-bloodless and Mechanical, Jas. W. Cokenower, Des Moines, Ia. Some Cases of Cured Appendicitis, Harry H. Everett, Lincoln, Neb. Diagnosis of Diastolic Heart Sound, LeRoy Crummer, Omaha. Insanity and Tuberculosis Following Typhoid, and Report of Two Unusual Cases, F. E. Walker, Worthington, Minn. Diseases Simulated by Typhoid Fever, D. T. Martin, Pomeroy, Ia. Diphtheria, O. C. Kessler, Ravenwood, Mo. Regular program will be issued March 1st. Titles should be sent to the secretary not later than February 15, as the program is limited to twenty-five papers. A cordial invitation is extended to the profession.

Obituary.—Dr. Earle E. Woolworth died in the Cumberland Street Hospital, Brooklyn, last week, of injuries received on Jan. 21, when he was thrown from his carriage. His skull was broken. Dr. Woolworth was born in Lyonsdale, N. Y., in 1872. After graduating he spent a year in practising in the City Hospital on Blackwell's Island and then moved to Brooklyn. He was married on May 7 last. He lived at 864 Sterling place. Dr. Woolworth was a member of various fraternal societies, as well as a member of the University Club.

Dr. Thomas N. DeBowes, one of the founders of St. Mary's Hospital in Brooklyn, died at his home, 429 Clinton street, Brooklyn, on Saturday night. He was born in 1833 and was a graduate of Trinity College at Dublin, Ireland, of the New York Medical College and of Yale University. In the Civil War Dr. De Bowes served as surgeon in a Connecticut regiment. He was an autopsy surgeon in the old city of New York for fifteen years. He leaves a daughter.

After an illness of about two weeks, Dr. John Homans, the eminent surgeon and physician, died Feb. 7, at his home in Beacon street, aged 66. In his profession few men were better or more widely known than was Dr. Homans. In surgery especially he had gained great prominence. Dr. Homans was born in Boston. Not only was his father a physician, but his grandfather, John Homans, also was engaged in the practice of medicine and surgery and was a surgeon in the Revolutionary War, performing service at the battle of Bunker Hill.

Dr. J. Frank Valentine, surgeon of the Long Island Railroad, died last week in his home in Richmond Hill. He had been ill for four weeks from typhoid fever, complicated with heart trouble. Dr. Valentine was 45 years old. He was born in the Seventeenth ward in Brooklyn. He was a graduate of the New York College of Physicians and Surgeons. He had been surgeon for the Long Island Railroad about thirteen years. He was a Past Master of Greenpoint Lodge No. 403, and Past High Priest of Altair Chapter No. 237, Royal Arch Masons; a Past Eminent Commander of St. Elmo Commandery No. 57, Knights Templar; a trustee of the joint board of Greenpoint Masonic Temple; a Grand Representative of the Grand Commandery of the State of New York to the Grand Commandery of Louisiana, Past Illustrious Potentate of Kismet Temple of the Ancient Arabic Order of Nobles of the Mystic Shrine, and represented that body at the annual session of the Imperial Council at San Francisco last July.

CORRESPONDENCE.

A TYPHOID FEVER SERUM EXPERIMENT.

To the Editor of the MEDICAL NEWS:

DEAR SIR: I have been experimenting with a serum in cutting short or aborting typhoid fever. The serum was obtained from a person who had recently had ty-

phoid by raising a blister on his back, about two ounces of serum being secured.

Two or three drams of this serum were injected into the typhoid patient with the result of lowering the temperature from one to four degrees. The injection was repeated on the two following days, temperature becoming normal in from 24 to 72 hours after the first injection.

The average duration of temperature in ten cases was ten days. Several of the cases had a temperature of 104° F. on the seventh day of the disease. In none did the serum fail to reduce the temperature. Convalescence was rapid and uneventful.

F. L. MORSE, M.D.

Pueblo Colo., Jan. 28. 1903.

SOCIETY PROCEEDINGS.

SOCIETY OF DERMATOLOGY AND GENITO-URINARY SURGERY.

Stated Meeting, held December 12, 1902.

Geo. K. Swinburne, M.D., Chairman *pro tem.*

A Case of Lupus Vulgaris.—Dr. H. Goldenberg presented this patient for Dr. Leviseur. The patient had been presented at a former meeting. She was cured by electrolysis, but the condition recurred upon the discontinuance of the treatment. Dr. Leviseur hoped to show her again at some subsequent meeting with her condition again cured by electrolysis.

Dr. H. Goldenberg presented this case which he had only seen yesterday for the first time. He had had trouble with his tongue since 1896. The man was married and had had children. No specific history could be obtained. He believed the lesion to be a gumma of the tongue, although there was absolutely no specific history. He had been under no treatment.

Dr. Lilienthal thought it was a syphilitic lesion and, on account of its location, he advised that the man be kept under careful observation and, with the first sign of any recrudescence of symptoms, the part should be excised and examined. Dr. Goldenberg said he had made a diagnosis of syphilitic glossitis and he also thought of the possibility of its being an epithelioma. He said he would first place the man on salicylate of mercury injections, six in number, and if no improvement followed he would adopt the suggestion made.

Case of Parasitic Affection of the Lip.—Dr. H. H. Whitehouse presented a negro, male, thirty-four years of age. The eruption began nine years ago on the center of the upper lip and gradually extended the entire width of the lip. After three years it healed spontaneously in this region, but extended around the corners of the mouth to the lower lip, across which it spread, and has remained to the present time, between five and six years. He states, however, that the disease almost entirely disappears during the summer. He denies syphilis and has never had any other affection of the skin. At present the upper lip is covered with small scars at the site of the eruption, the first three years of its existence. The entire lower lip is covered with crusts which extend beyond the vermilion border to the mucous membrane; this bleeds very readily. From each corner of the mouth the disease spreads downward in the form of two oval-shaped raised warty patches about an inch in diameter, painful as the least movement breaks the surface and causes it to bleed.

Drs. G. T. Elliot and Goldenberg suggested making an examination of the secretions for blastomyces. Dr. Whitehouse believed the condition to be a parasitic affection of the lip. Whether any blastomyces were present or not he did not know, but would accept the suggestions made and have an examination made. Histologically the lesion had been examined, but nothing had been found. The fact that it began on the upper lip, and the length of time it had existed made it a peculiar growth. He thought it might be both a streptococcic and blastomycotic infection. He said he would make a further report later.

Axial Rotation of the Penis.—Dr. James Pedersen presented a young man who had been unfortunate enough to have a mysterious malformation of his penis. The glans penis was rotated on the body of the penis, so that practically the meatus stood horizontally, the rotation being to the left. This malformation led to an unhappy act by a practitioner and an uncomfortable error. In doing an internal urethrotomy the practitioner failed to note this rotation to the left and, in using the dilating urethrotome, he dilated the meatus in its narrow diameter and drew the blade completely out bodily in order to enlarge the meatus and divided the structures along the dorsum. The result was that he made a deep slash into the substance of the glans penis and set up a violent hemorrhage. Both the patient and the doctor then had a very unhappy time until finally the doctor placed his patient in a cab and took him to Bellevue Hospital, where he was received by Dr. Love, the house surgeon. Upon separating the lips of the wound there was found a spurter. The part was packed and a small catheter passed by the packing. The patient was kept at rest for forty-eight hours. Then when the patient urinated and the part washed out without any return of the hemorrhage, it was thought that this was an end of the matter. But at the end of a few hours the hemorrhage again started up. Packing was again tried, but at the end of a week the hemorrhage not being controlled, an external urethrotomy was done. The wound in the glans penis was sutured, taking as deep stitches as was possible, and it seemed to him as though he took up the bleeding point, but even with the bandaged urethra at rest a venous hemorrhage occurred from the deeper part of the wound, which he thought must have invaded one of the corpora cavernosa. After packing for a few days the hemorrhage was controlled. He presented the patient as an illustration of an interesting malformation. The patient was not a so-called bleeder.

Dr. Forbes Hawkes thought the rotation might probably be due to his urethral stricture; it seemed to him as if the whole penis was twisted. Dr. H. H. Morton was reminded of two cases of operation upon the floor of the urethra, in which the bleeding was persistent, almost uncontrollable, but was finally stopped by the use of the endoscopic tube and using pressure and counter-pressure. It was a mystery to him why the bleeding should continue so, and he thought that possibly the artery was only partly cut through. Dr. Lilienthal at first thought that the stricture might have been the cause of the malformation, but on questioning the patient, it seemed to him improbable, because the patient would have noticed that change in his anatomy; therefore, he was inclined to think that it was, after all, an anomaly. Dr. Swinburne thought that the hemorrhage was rather unusual, even though the incision be made in that portion of the canal that they were not in the habit of incising. The hemorrhage was greater than what was usually encountered. Even in cases of hypospadias in operating through the glans penis, he did not get such hemorrhage. Dr. Pedersen said that in doing hypospadias operations, the incision was made in the median line. In all operations upon the genito-urinary tract, if the incision be made in the

median line, there would be a minimum amount of hemorrhage. The incision in the patient presented was in the substance of the glans and at right angles to the median line. He had only seen one case of hemorrhage following a meototomy at the internal commissure and pressure readily controlled it. Dr. Bangs had related to him a case in which he had been called in consultation. The hemorrhage was from the deeper portion of the penis, and it was controlled by the use of the endoscopic tube and counter-pressure being made by bandages. He firmly believed that he had to deal with a true anomaly; that the practitioner, after introducing the dilating urethrotome, did not carefully examine, and so he failed to note that the corpora cavernosa were not in their proper position. This was a case of true axial rotation. The raphé followed such an irregular course that it tended to corroborate his belief.

A Case of Syphilis of the Lip.—Dr. James Pedersen presented this patient, who had entered the wards of Bellevue Hospital with an ulcer on the upper lip. He spoke no English and, therefore, a complete history was impossible except through an interpreter. One and a half years ago he had a sore on his penis which lasted 2½ months. What treatment was given he did not know. Two and a half months ago a pimple, so the patient expressed it, appeared, it became crusted and he picked it with his finger, and it suddenly increased in size. When the patient entered the hospital it was about twice the present size. There was a thick crust, covered by a mucous discharge, which came from beneath the crust, where were found pale, sloughing granulations. There was some edema, but very little inflammation or induration. The question of diagnosis was raised. The condition shown was that reached after the most vigorous antisyphilitic treatment. About one week ago Dr. Pedersen presented this patient to the University Clinical Society and epithelioma was readily excluded and there remained a doubt as to whether it was tuberculosis or syphilis; they then did not have any history to guide them. One or two gentlemen thought that it was tuberculosis; the others did not. With a history to guide they made a tentative diagnosis of syphilis, and the result of the vigorous antisyphilitic treatment had, he thought, cleared up the diagnosis. There was a marked absence of induration in the lesion.

Dr. Lilienthal did not know what it was, but he was inclined to believe it was a syphilitic lesion. It could not have been an epithelioma, because the patient was getting better. Dr. H. H. Morton thought it was a precocious gumma. Dr. E. L. Cocks thought the patient was too young to have an epithelioma. Dr. Whitehouse thought it was a gumma with a mixed infection. Drs. W. B. Brown, Kingsbury and Goldenberg thought it was a gumma.

A Case of Dermatitis Medicamentosa.—Dr. W. B. Brown exhibited this woman, who had presented herself to the Demilt Dispensary for treatment. She had been unfortunate in her marital relations and had contracted gonorrhea. For this she was advised by her friends to take some so-called "neurotic drops." Over the body was found an erythematous rash. The patient did not feel badly and had no nausea. The doctor thought these drops contained some balsam copaiba or oil of turpentine. The whole trunk was covered and there were a few lesions upon the face and lower extremities.

A Case for Diagnosis.—Dr. H. Goldenberg presented a boy, about twelve years old, who had been under observation since last April at the Mt. Sinai Dispensary. The whole of his forearm was in a state of deep ulceration. There was a spina ventosa on one side and a loss of one of his phalanges. Also he had an osteomyelitis and osteitis of one foot. When he first saw the boy he thought he had to deal with a case of tuberculosis, but because of the outline of the disease and because the boy mentally was not normal, he thought probably it was a syphilitic lesion, and the boy was placed upon injections of salicylate of mercury, eight in number. The ulcerations healed. The patient returned in October in a condition not as bad as before, but much worse than when last seen. He was again placed on injections of salicylate of mercury, four in number, without the slightest improvement. This patient had also been presented to the Harlem Medical Society as probably a tuberculous syphilide. Dr. Lapowski thought it was a case of blastomycosis, while Dr. Goldenberg did not think so; he had a piece excised and examined. From the bone lesion he was inclined to believe that he had a case of syphilis combined with a tuberculous lesion. The father and mother are well and have had a number of children. This patient has had no Hutchinson's teeth or keratitis.

Dr. T. G. Lusk thought it was both syphilitic and tuberculous. Dr. Whitehouse said it was almost impossible to give an absolute opinion, but he thought it was syphilitic. The treatment he had received he did not believe militated against that diagnosis. He advised more vigorous treatment. Dr. Goldenberg said that the differential point had been made by Levine, that when there was multiple spina ventosa it was not specific. Syphilitic osteomyelitis was usually found in more than one toe or finger. Dr. Kingsbury believed that it was a case of combined tuberculosis and syphilis and said that better results could be had from the iodides than from the mercury preparations. Dr. E. L. Cocks said it was a mixed infection and advised good general treatment, such as cod-liver oil. Dr. Morton thought it was a case of tuberculosis. There were no Hutchinson's teeth or keratitis. Dr. Lilienthal thought the lesion was a syphilitic one. The microscope could teach us something as to its nature, whether tuberculous or not. Dr. Elliot believed it to be syphilitic. He did not place much reliance upon such a statement as made by Levine, nor did he take much stock in family histories in such cases, and so far as the treatment was concerned, that was rudimentary. He had seen a case of syphilis under treatment two or three years, the salicylate of mercury being given. Another case of a syphilide, now under his observation, had been present eight years and the patient had been given many things, hypodermic injections, iodide of potassium, mercury internally, baths at Aix-la-Chapelle and other places and without any marked effect whatever. Cases of hereditary syphilis demanded the iodides and phosphate of iron, outdoor life in the country and good hygiene to get good results. Dr. Swinburne agreed with Dr. Elliot regarding the improving of the general nutrition. He did not think that if the child should improve under cod-liver oil treatment that it should militate against its being syphilis. Dr. Goldenberg said the fact that he had placed the patient under vigorous antisyphilitic treatment showed that he had considered it originally a syphilitic lesion. He intended to administer tuberculin and see if he could get any reaction. He would accept the suggestions made and place the patient under vigorous treatment with iodide of potassium and the syrup of the iodide of iron. He could not make any change in the patient's hygienic surroundings on account of the parents being so poor.

A Case of Prurigo.—Dr. Goldenberg presented this patient whom he had seen for the first time only last week. He thought it was a typical case of prurigo.

It first struck him that prurigo in a boy of thirteen years, who had had it since he was two years old, should be accompanied with more infiltration than was found. The extensor surfaces were as much affected as the flexors. There was slight glandular enlargement. There were some lesions on the back which looked like lichen scrofulosorum.

Dr. Kingsbury thought it was simply a case of chronic eczema with a dermatitis resulting from the treatment. Dr. Whitehouse could see no evidence at all of prurigo. He thought the lesion upon the face would improve if Lassar's paste was applied, or some soothing treatment. Dr. Lusk said that it was only an eczema which might follow a dermatitis. Dr. Cocks said that the patient might have had prurigo, but there were no evidences of it now. He thought it was a case of eczema. Dr. Brown believed the same. Dr. Goldenberg said he presented the case because of the interest attached to its being eleven years in duration. When he first saw him he had a true case of prurigo. It was rather unusual to see a case of eczema last eleven years.

Specific Phlebitis.—Dr. H. Goldenberg presented this patient, who was twenty-nine years old, married, two children, no miscarriages and who had been sick about two years on account of an eruption upon the left lower extremity which had existed from six to nine months. Upon the inner surface of the left leg there was an induration in the cutaneous and subcutaneous tissues, of bluish color, not ulcerated. There were a few smaller nodules situated over the gastrocnemius muscle. When he first saw her the lesion had the appearance of erythema nodosum; but upon closer examination the diagnosis of phlebitis was made. The eruption itself was not ulcerated and he thought he had to deal with a case of erythema nodosum. Under specific treatment the eruption disappeared, although there was no history of any syphilitic lesion given. About six months ago an eruption developed which corresponded to the superficial saphenous vein and about four weeks ago two or three typical gummata were found. He presented the case as one of specific phlebitis, a disease quite rare. Broksch has collected but 32 or 34 instances of it.

Dr. Lilienthal did not think that Dr. Goldenberg had proven his case of phlebitis. He thought it might as well be a case of specific lymphangitis; a phlebitis going on to such an extent would have been accompanied with abscesses, or even hemorrhages. Also, the site of the lesion was not over the superficial saphenous vein, nor any vein of any considerable size. Dr. Elliot thought it was making a very fine diagnosis between phlebitis and lymphangitis, and he did not see how they could differentiate them from a diffuse gumma. Dr. Lilienthal called attention to the fact that the patient had not complained of any edema at all, and if there had been such a considerable inflammation of the vein, there must have been some trouble with the return circulation. Dr. Goldenberg said that there was no doubt but that the patient had phlebitis. He wanted to prove it histologically, but the patient was pregnant and would not allow a piece to be excised.

A Case for Diagnosis.—Dr. T. G. Lusk presented an interesting case seen last spring with a sycosis which involved both the upper and lower lip, which, under the proper treatment with sulphur and mercury, disappeared within a few weeks. He was then advised to apply the same treatment now and then. In September he returned and the lower lip presented a peculiar appearance with deep seated nodules or papules over it. Various treatments were used without good results. There was no pustulation around the hair follicles; the condition was very superficial. Still he epilated and followed it with an application of 10-per-cent. trikresol. Reaction followed, which was quieted somewhat by the application of ichthyol. He made a tentative diagnosis of blastomycosis. He was then placed on iodide of potassium, 10 drops three times a day, and without any improvement; this treatment has only been carried out for one week. Two smears of the superficial pustules were made and the pathologist stated that he found bodies like those in regular blastomycosis. He is now making cultures, and he believes that he will succeed. The case was presented for diagnosis and for suggestions as regards treatment.

Dr. Whitehouse said that clinically he could recognize nothing except simple sycosis in the lesion on the chin. Dr. Kingsbury agreed with Dr. Whitehouse. Dr. Brown thought it was a case of sycosis of the papillomatous type. Dr. Goldenberg thought the case one of sycosis and said that too much stress should not be laid upon the microscopical findings in blastomycosis. A case seen by him four or six weeks ago looked like it, and the smears from the purulent discharge made the pathologist say at first that there were a few yeast-buds, but later it was found to be nothing. Dr. Elliot made a diagnosis of sycosis. He spoke of a papillomatous growth which might be removed by electrolysis. He thought there was a question whether it was an accidental infection with yeast spores and this, by no means, was proven. Dr. Lusk said there was no question about the case being one of pure sycosis last spring which, under treatment, disappeared. But in September the lesion was twice as large as now, with papillomatous tumors perhaps the size of a pea or smaller and which resembled the lesion upon the back of the head, keloidal in character except it was softer. There was no pustulation about the deep follicles. He thought it was probably a blastomycotic infection on top of the other.

Lupus Erythematosus.—Dr. H. Goldenberg presented this case of a woman, forty-two years old, married nineteen years, with one miscarriage. She had been under treatment during the past five or six years. He presented her as a case of lupus erythematosus on the lip and mucous membrane. At one of the first meetings he presented a case with similar affection of the mucous membrane which Dr. Elliott remembers. That case has been on antisyphilitic treatment ever since. He thought that this condition of the mucous membrane was most interesting.

Dr. Elliot did not see how it could now be called a case of lupus erythematosus. Dr. Whitehouse regarded it as one of lupus erythematosus. Dr. Goldenberg said he had had her under observation for five or six years for this interesting thickening of the mucous membrane. This is the third case he had had in which the mucous membrane had been affected, and in the former cases his diagnosis had been doubted. Any specific trouble could be excluded in this instance, for he had had her under mixed treatment for two or three years. She had been directly under his observation and, in spite of the treatment, new eruptions appeared.

Case for Diagnosis.—Dr. H. H. Whitehouse presented John G., sixty-six years old, who had an eruption which began seven years ago. There was first a small red patch which slowly enlarged to its present size, about three inches in diameter. There has never been any ulceration nor any considerable swelling. He complained only of soreness. While under treatment the past year smaller lesions have appeared on the lower legs and on the wrists. There was no history of syphilis or other skin trouble. Behind the right knee was an indurated patch, dull purplish-red in color, of

an irregular oval shape, with the central portion slightly depressed and a hard raised border. The upper part was broken and bled slightly as the result of treatment he had had, but ordinarily the patch was always dry and quite smooth, there being but slight tendency to scale. The lesions on the lower legs were small, slightly infiltrated red patches of quite indefinite character without scaling or subjective symptoms. The redness of these patches disappear considerably under pressure. Upon the flexor surfaces of the wrists the eruption is of the character of an erythema in patchy form; the remainder of the cutaneous surface was exempt.

Dr. Elliot said that he had treated this case for a long time for syphilis. He thought the diagnosis was an open question, although he did not see how any other diagnosis than one of syphilis could be given at the present time. The patient seemed to be particularly susceptible to the iodides and the internal administration of mercury. Mercurial plaster had been applied when the man was under his case with a certain amount of improvement. When he first saw him there was a central sinking in, and the area was quite small; now it was quite large. Dr. Goldenberg was inclined to make the diagnosis lupus erythematosus. Drs. Cocks and Brown agreed with Dr. Goldenberg. Dr. Kingsbury thought it was a case of syphilis. Dr. Whitehouse said the patient could not stand antisyphilitic treatment. Nevertheless he had had mercurial plaster and local measures applied and, in spite of it, the lesions remained the same to-day, with new lesions appearing, but of somewhat different character. The diagnosis of lupus erythematosus had not occurred to him.

Perithelioma of Kidney with Necrosis.—This specimen was presented by Dr. Howard Lilienthal. It was removed from a woman fifty years old, who had been admitted to the Mt. Sinai Hospital on November 5. The menopause occurred 1½ years ago. She has had malaria and facial neuralgia several months ago. Her present condition has been of three months' duration, beginning with weakness and marked loss of flesh without any pain. Four weeks ago she had difficulty in passing her urine, which was accompanied with a small amount of bright red blood. During the following two days the urine was very dark in color, and on two occasions, she passed two clots of blood. The amount of urine and frequency of urination were unaffected. There was no headache or dyspnea. The abdomen showed much relaxation of its walls with tympanites, and a marked asymmetry. There was a huge mass protruding in the left flank, reaching the median line. It had rounded edges, was elliptical, the long axis running downward and inward. The surface was lobulated. Above it ended just behind the free border; it reached posteriorly, deeply in the lumbar region and was readily ballotted. Internally it reached well behind the median line and below the iliac crest. It was freely movable. The colon was pushed inward. No intestine could be felt in front of it. It was solid and very hard. The tumor could not be felt in the vagina, and apparently it had nothing to do with the pelvic organs. On November 8 he operated upon her, making first the Israel incision for nephrectomy. Pushing aside the peritoneum he got this mass out without cutting into the peritoneum at all. The amount of bleeding from such a large kidney was not at all great. The patient went to bed in good condition and has remained so ever since. The wound has healed, except for one opening left for drainage. This mass turned out to be a peritheliomatous tumor, due to embryological conditions. These tumors do not give rise to symptoms until pretty late in life. He had had another case occurring in a woman thirty-five years old and still another occurring in a man forty years old. The two women recovered but the man did not. The man's tumor was a great deal larger than the other two. In its interior it had necrosed. The peculiar symptom of bleeding is practically a constant one in these cases. A diagnosis can only be made with certainty with the appearance of secondary growths or by operation. So soon as you cut into a mass of this nature one can see a peculiarly yellowish color. In cases of small tumors of this kind cutting into them would lead you to think that possibly you had to deal with a case of tuberculosis; but when one had seen several such cases the mistake would not likely occur. This growth was usually found on the superior portion of the kidney. The pathologist stated that the mass was perithelioma, that is, a rather vascular tumor nearly sarcomatous in type.

NEW YORK NEUROLOGICAL SOCIETY.

Stated Meeting, January 6, 1903.

The President, Pearce Bailey, M.D., in the Chair.

Marked Case of Exophthalmic Goiter.—Dr. J. Arthur Booth presented a married woman, twenty-four years of age, exhibiting exophthalmic goiter to a marked degree. The symptoms had appeared four years ago, the right eye being first affected. She presented the rapid pulse and nervous symptoms characteristic of this disease. He purposed having the sympathetic exsected on each side, and would report upon the case later.

Dr. M. Allen Starr said that the tension of her pulse was very high and the pulse itself was small. This interested him because in the majority of cases he had seen there had been a decided diminution of arterial tension. This had suggested to him the propriety of using thyroid in cases of high arterial tension, especially in arteriosclerosis and allied conditions. Of late he had tried this, and had been pleased with the results.

Dr. William M. Leszynsky said that in a recent journal article the statement had been made that the goiter would be practically obliterated for the time being if the patient, while lying down, made an effort to draw the head forward. The pressure of the sternomastoid and other muscles seemed to cause a complete obliteration of the goiter. He had tried this experiment in two cases, with the result stated.

Dr. Booth said that at one time he had been of the opinion that many of these cases presented a high tension pulse, and many of them seemed to be helped by aconitia, yet this condition did not seem to prevail in the majority of cases. He had not tried the experiment spoken of by Dr. Leszynsky. He had seen four operations for excision of the sympathetic done, and in two of them the effect on the goiter and on the pulse was prompt and very marked.

Dr. W. B. Noyes said that this operation was certainly a very dangerous one. He had recently had a patient operated upon in this way at St. Luke's Hospital. The operation was rather prolonged, and the patient died on the table without the usual signs of shock.

Dr. Booth said that he had been present at that operation, and the case had impressed him as being a very bad one for this operation.

Dr. B. Onuf presented a man having a peculiar affection of the terminal phalanges of the hands. It first began about eleven years ago, the first thing noticed being some thickening of the terminal phalanx of the middle finger of one hand. The corresponding finger of the other hand was next affected, and gradu-

ally the disease involved the other phalanges. Subsequently the nails presented transverse ridges, and became very brittle. At the present time, there was very marked thickening of the terminal phalanx of the thumb, and all of the terminal phalanges were in a state of semiflexion, and showed moderate thickening. There was no specific history, and the examination of the lungs was negative. There was nothing pointing to syringomyelia. Several radiographs of the case were presented. These showed that there was almost complete absorption of the entire terminal phalanx of the thumb and of the middle and index fingers. A radiograph of the foot showed similar changes, though less marked. The disease appeared to Dr. Onuf to be a degenerative one. Radiographs of five phthisical patients having clubbed fingers had been studied by him, but they showed nothing like the same changes as the case just presented.

Dr. Booth said that seven years ago he had seen a piano polisher whose both thumbs were alone affected in this manner.

Dr. Starr said that about seven years ago he had taken photographs of a woman at his clinic who presented a similar condition. The case was not understood at the time, and the photographs were taken because it was considered a curiosity.

Spastic Paraplegia.—Dr. George A. Lawrence presented specimens from a case of spastic paraplegia that he had had under observation since Nov. 9, 1895. The patient gave a history of scarlet fever and of dorsal Pott's disease in early childhood. He was able to attend to business until the summer of 1895 when he fell downstairs and became unconscious. This was followed by several epileptiform seizures. Examination showed no paresthesia or anesthesia, but there was marked ankle clonus and fibrillary twitchings of the muscles were present in the legs, with jerking of the limbs at night. The man received iodide of potassium, in doses as high as 200 grains, three times a day, and also strychnine sulphate in doses varying from one one-hundredth to one fiftieth of a grain. He improved greatly under this treatment, and by the fall of 1896 was going to business. In the following March there was another exacerbation. In September, 1898, he was able to return to business. On March 15, 1899, there was considerable pain in the chest and a drawing up of the limbs was still more marked. In October of that year there were marked fibrillary twitchings of the muscles of the legs and thighs. In December, 1900, there was another exacerbation. On Oct. 2, 1902, the upper extremities were becoming involved, and the patient was growing emotional. On Dec. 1 the heart action and breathing were rapid, and he was exceedingly nervous. On Dec. 26, 1902, death occurred. A post-mortem examination of the brain and spinal cord alone was permitted. This was made by Dr. Strong and himself the following morning. The spinal canal was found to have been encroached upon at the site of the old kyphosis, and there was much thickening of the anterior surface of the dura mater. The anatomical diagnosis was spastic paraplegia due to a chronic myelitis. The microscopical examination had not yet been made.

Address of the Retiring President.—Dr. Joseph Collins, in retiring from the Chair, reviewed the scientific work of the Society during the two years he had been its president.

Inaugural Address of the President.—Dr. Pearce Bailey selected as the theme for his address, "Fracture at the Base of the Skull." He said that from the uniformity in localizing signs the conclusion was unavoidable that the brain lesion accompanying this fracture must also be quite constant. Neurological examinations were often made with difficulty because the patient was comatose. The cranial nerve injuries were usually multiple and came on immediately or within a few hours. When appearing still later they were difficult of explanation. Paralysis of the olfactory nerve was sometimes the only focal symptom, but it was usually absent altogether. Blindness and amblyopia in fractures of the base were usually due to fracture of the optic canal. It was probable that amblyopia might also be caused by hemorrhages at the base of the skull, which push their way into the optic canal and compress the nerve. Visual disturbances following fractures were always alarming symptoms. Traumatic affections of the optic nerve were frequently accompanied by oculomotor palsies. The frequency with which the third, sixth and fourth nerves were involved was in the order named. The sixth nerve and the seventh were often injured, and this was commonly associated with deafness. It was rare for oculomotor palsies to persist longer than a few months. In most of the cases of traumatic ptosis that he had seen there had usually been sufficient weakness of the affected eyelid left to enable one to determine which lid had been involved. Generally, the dilated pupil corresponded with the side having the greater brain injury. Of five cases presenting equally dilated pupils, only one recovered. The facial was the most frequently involved single nerve. Paralysis of the extremities showed itself more commonly as a weakness or as a hemiplegia. Paraplegia proved almost invariably fatal. The knee-jerks were frequently diminished or lost at first, but later returned, and might even become over-active. Convulsions were very rare in fractures at the base. From the initial, profound coma a large number of persons who die never emerge, but profound and persistent coma was rare in cases which recover. The most characteristic mental state in these cases was semi-coma. A fatal result was to be looked for in more than one-half of the cases of fracture at the base. A collection of 494 cases showed a mortality of 57 per cent. In probably 95 per cent. of the fatal cases death occurred within five days of the receipt of the injury. Age did not seem to be an important feature in prognosis. Alcoholism affected profoundly both the immediate and ultimate prognosis. With regard to the ultimate prognosis, the speaker said that the literature appearing on this subject was meager. He had been able to obtain the ultimate result in 14 out of his 28 cases. In all of the cases there was a period of at least one year after the injury. In general, it might be said that in the majority of cases the patient would be as well as before the injury at the end of the first year. In a certain small proportion of cases, however, there were certain changes in disposition or mentality. Irritability of temper, quarrelsomeness, headache and diminished resistance to alcohol were noted in some of those persons, particularly in alcoholics and those suffering from diseases, such as Bright's disease, which affect the arteries. Epilepsy did not seem to be a consequence of fracture at the base of the skull. If brain injury figured in the etiology of insanity such patients should be found in insane asylums. It was probable that there were 500 cases of fracture at the base occurring annually in this city, and that 150 of these persons recovered; hence, if such an injury were a common cause of insanity these persons would be found in the insane hospitals of this vicinity. Dr. A. E. Macdonald had kindly investigated this question for him at the Manhattan State Hospital, but had been unable to find more than

one such patient in a thousand. The conclusion seemed to be that fracture at the base was a negligible quantity in the etiology of insanity.

The Daily Rhythm of Epilepsy and Its Interpretation.—Dr. L. Pierce Clark read this paper. He said that in 1897 he had collected and tabulated 9,545 epileptic seizures by hours. The greatest number of seizures occurred at 4 A.M. Since then he had collected cases occurring in both sexes at the Craig Colony, and had tabulated 150,000 epileptic seizures. During the greater part of this study sedative treatment was at a minimum. The great majority of the patients were in bed, in the first group, and slept from 7.30 P.M. to 5.30 A.M. There were three fairly marked curves: that of early night, or 9 P.M.; that of early morning, or 4 A.M., and that of noon. Another class studied was among the outdoor workers at the Colony. The three main curves were much the same as in the other group, and, as in that group, there were fairly marked secondary curves at 9 A.M. and 5 P.M. In another chart, comprising the whole of the 150,000 seizures, the secondary curves were still more apparent. It was found that the seizures were about equally divided between the day and night. Sleep was deepest during the first hour, then became lighter for an indefinite period, and then deepened again and lightened once more about one hour before awakening. In certain cases in which deep and perfect sleep did not come on at once, various crises occurred. During the deepest sleep of the epileptic he had never been able to elicit the knee reflexes without adopting sufficiently harsh measures to awaken the person. The bromides diminish the afferent impulses to the cerebral cortex, and are aids to cerebral inhibition. At noon the epileptic became fatigued and was in a condition comparable to light sleep. Moreover at this time the heaviest meal was taken, and auto-intoxication was at the maximum. Epileptics should not be idle; they should have a simple but not a monotonous occupation. This study showed that the twenty-four hours were roughly divided into eight-hour periods.

Dr. B. Sachs asked for further information regarding rhythm in the individual epileptic; also if one of the reasons the attacks were so apt to occur in the early morning hours was that the air of the sleeping apartment was especially vitiated at this time. He would also like to know if it were safe for epileptics to engage in occupations which would place them in danger should a seizure occur.

Dr. M. Allen Starr said that he had noticed that in the individual there was a tendency for the seizure to return at a certain hour. He had just seen a patient who for sixteen years had never had the attack except between six and seven o'clock in the morning, but who for the first time yesterday had had an attack in the afternoon. This fact seemed to him of some importance in the treatment. Attacks occurring in the early morning hours seemed to point to a weakened circulation in the brain, and hence in such cases he was disposed to combine such remedies as digitalis and strophanthus with the bromides. In some of these cases he thought benefit was derived from awakening the patient early in the morning and giving some hot stimulant.

Dr. W. M. Leszynsky said that in cases of nocturnal epilepsy the rhythm had been considerably changed by the bromide treatment. The attacks would often disappear at night and occur in the day time when they had not done so before this treatment was instituted. Mention was made of a man whose attacks had always been at night while taking bromide at night, and whose attacks first appeared in the daytime when the bromides were given during the day.

Dr. J. Arthur Booth said that he too had observed this change in the rhythm as a result of treatment.

Dr. I. Abrahamson asked if Dr. Clark had made any investigations on the metabolism and blood pressure at the time of maximum seizures.

Dr. Smith Ely Jelliffe said that modern investigations had shown that the blood-pressure was at a minimum in the early morning hours. It had been claimed that there was more or less rhythm in the leucocyte count at the different periods of the twenty-four hours.

Dr. Clark said that there was no doubt that investigation of the metabolism and blood pressure would show them to go hand in hand with that condition expressed only too indefinitely by the term "auto-intoxication." Alterations in blood pressure, he thought, varied with the depth of sleep. The rhythm of the epileptic seizures were certainly greatly influenced by treatment, as well as by diet, exercise and other things. He had known many epileptics to carry on the trade of carpenter for a long time without meeting with any accident, but the latter was prone to come when they became so accustomed to their work as to relax their guard.

SOCIETY OF ALUMNI OF BELLEVUE HOSPITAL.

Meeting of January 7, 1903.

The President, Robert T. Morris, M.D., in the Chair.

Open Appendix.—Dr. W. Gill Wylie presented a paper on this subject. He said that, as a rule, the surgeon was not called to see a case of appendicitis until some local peritonitis had developed. He was sure the diagnosis could often be made, however, before this stage, and that this would clear up many cases ordinarily set down as chronic dyspepsia or chronic colitis. These cases were very apt to be found in women who were poorly developed in their generative organs, and who were delicate. In many of these cases, he contended, there was an "open appendix," and that this gave rise to much of the nausea, vomiting and abdominal pain which they experienced. Many were complicated by a loose right kidney. The differential diagnosis was naturally difficult. These persons should be put to bed on an exclusive milk diet, and should be observed daily for a time. Local tenderness directly over the appendix was the best indication here of trouble in this organ. There was apt to be a slight and irregular rise of temperature. Where there was imperfect physical development and more or less enteroptosis the appendix was often found hanging over the brim of the pelvis. The symptoms were so mild and so vague that both the general practitioner and the surgeon were apt to be misled. One of the first cases treated by him had been for a long time known to him. Finally, in one of the attacks he found tenderness over the appendix and enlargement of some of the retroperitoneal glands. Two physicians diagnosed typhoid fever, but he insisted that it was appendicitis. In the next attack he operated and found an open appendix. By an "open appendix" he meant one in which the mouth was only slightly constricted or guarded by valvular structures as to allow of easy entrance of matter from the bowel. It was his belief that in many delicate and dyspeptic persons the accompanying relaxation was apt to lead to the formation of an open appendix; at any rate, in the majority of the cases now under consideration the mouth of the appendix was found wide open. A typical case of this kind he had seen in a young girl who came to him with a slight rise of temperature and a history of very frequent attacks of nausea. Slight tenderness over the

appendix and a close study of the case led him to make an exploratory incision, and it revealed the proximal three-quarters of an inch of the appendix very wide open. Another case was that of a young woman in whom he had found a very loose right kidney, which caused pain when pressed upon by the clothing. The appendix was exceedingly tender. For three or four months she was treated by a stomach specialist, and while she improved it was impossible for her to eat like others without experiencing an attack of indigestion. Dr. W. T. Bull then saw the patient and advised operation on both the appendix and the loose kidney, but considered the latter the chief offender. On opening the abdomen Dr. Wylie found old adhesions around the appendix, causing a turning upward of the latter, which was four inches in length. The right kidney rested directly over the appendix. In all of the typical cases of open appendix operation had yielded him most satisfactory results. Under favorable conditions there should be no mortality from this operation in uncomplicated cases.

Dr. John F. Erdmann said he had followed the teachings of Dr. Edebohls for the last two or three years. In every case in which he found a floating kidney on the right side he always advised removal of the appendix at the time of anchoring the kidney. Some time ago a physician had come to him with a markedly prolapsed right kidney, which he attributed to horseback riding over country roads. The speaker advised anchoring the kidney and the removal of the appendix at the same time. He learned subsequently that this man had been operated upon at St. Luke's Hospital by Dr. Curtis for attachment of the kidney, but that about four weeks later a second operation had been made necessary by a sharp attack of appendicitis.

Dr. Alexander Lambert said that in the past two years, since his attention had been drawn to this subject by Dr. Wylie, he had found that more of these cases were met with than he had previously supposed. There was usually a chronic dyspepsia, and pretty constant discomfort without any well-defined acute attacks of appendicitis. He had been impressed at the great rapidity of improvement in appetite, digestion and nutrition which occurred immediately after operation. This was much more noticeable than after operations for acute appendicitis. In a recent case, supposed to be one of open appendix, this organ was found long and very narrow.

Dr. C. E. Quimby said that medical men saw many of these cases, and hence he would like to know whether Dr. Wylie assumed that the appendicular trouble was the beginning. In many cases he had himself been inclined to the opinion that the original trouble was a colon impaction, especially when associated with gas formation. It had occurred to him that the open appendix was the result of the pressure of gas. This pressure was absolutely uniform in every direction, and hence, it was probable that it might open up the appendix when the muscular layer of the latter had become weakened by auto-infection and prolonged impaction. He had certainly seen the whole set of symptoms disappear in cases which he thought Dr. Wylie would call open appendix as a result of a thorough and persistent evacuation of the bowel.

Dr. Wylie said he had not reached the conclusion that the appendicular trouble was the original one, but rather that it had resulted from a chronic intestinal disorder. Many of his cases had been permanently relieved by operation, even when their condition had been so bad that tuberculosis had been suspected. The fact that the old symptoms did not return showed that the appendix was the chief, if not the only, cause. In some of the cases complicated by loose kidney the results had been good simply from operating upon the appendix.

Dr. William J. Chandler said that all who saw much of appendicitis would feel the force of the remarks made by Dr. Wylie, and he thought they would all be impressed with the idea that attacks of intestinal disturbance often precede appendicitis. He recalled one case of persistent intestinal colic without any localization in the region of the appendix. Finally, the appendix was removed and since then there had been no intestinal colic. The term "open appendix," was new to him, and he could not say that in operating he had observed any special patulousness of the opening. He had noticed, however, a relative enlargement.

Dr. Frederick Holme Wiggin, agreed with Dr. Wylie, that disease of the appendix was very common in women, as was also colon impaction, to which he believed the former condition was largely due. For many years he had been opposed to removing the appendix in connection with abdominal operations performed for other conditions, unless the history of the patient indicated disease of this organ, and the appendix when the abdomen was opened was clearly diseased; but he had gradually learned that nearly most all of the appendices met with in his abdominal work were diseased. In some of these cases, where the dyspeptic symptoms had been especially marked and the patient had exhibited a craving for stimulants, he had found that the removal of the diseased appendix had restored the natural appetite and had caused the cravings for stimulants to disappear. Consequently he had during the last year or two strongly favored the removal of the appendix in patients, exhibiting marked dyspeptic symptoms of obscure origin accompanied by chronic constipation when irrigation of the colon with saline solution had failed to remove the dyspeptic symptoms; even when the pressure over McBurney's point had failed to reveal special tenderness: in a number of instances the appendix had been found to be markedly diseased and the operation had been followed by the disappearance of the stomach symptoms and the rapid return of the patient to health.

Dr. Robert T. Morris said that about the year 1894 Senn had described a normal involution of the appendix, showing that after the age of twenty the lymphoid layer gradually became replaced by connective tissue. This occurred, as a rule, evenly. These cases of normal involution were found in almost all post-mortem examinations made in persons over forty years of age in whom it was supposed symptoms of this condition had not been present. About two months ago, the speaker said, he had described in the New York *Medical Journal* a series of involution cases, and had described also the symptoms associated with the involution. These cases were exceedingly common, and the complex reflex symptoms certainly disappear after the removal of the appendix, even though there had been no symptoms of acute infection which would lead most surgeons to operate. Dr. Quimby's question as to whether these symptoms were primary or secondary should receive further consideration. Gas pressure must certainly exert some influence, yet it was known on the other hand that normal involution occurred in most persons suffering from indigestion. In a recent discussion on intestinal dyspepsia at the Academy of Medicine nothing was said about these involution cases, though the descriptions of some of the cases indicated that they belonged to this class. There was no doubt that many of these appendices were quite widely open. In many cases the appendix was said to be normal when removed at operation, and yet the patient im-

proved markedly after the operation. Such an appendix was the seat of normal involution. The association of appendicitis with loose kidney was very common. Edebohls was of the opinion that the loose kidney pressed upon the superior mesenteric vein, causing stasis in the cecum and appendix. In many of these cases Luschke's ganglion was tender, even without distention of the appendix. It could not be denied that a congested appendix was very frequently found in association with a loose right kidney.

Dr. Wylie, in closing, said that he had been studying this subject with great care for a period of six or eight years, and he was pleased that his communication had been so well received. Mention was made of a case in which a woman, while pregnant for the first time, developed an abscess, which was thought to be in the kidney. Before any operation could be done the abscess emptied itself through the bowel and she aborted. She subsequently suffered a good deal from attacks of colitis, and finally he diagnosticated appendicitis and removed the appendix.

The Significance of Itching as a Concomitant of Disease, and as a Cause for Disease.—Dr. E. B. Bronson said that in a study of this subject, made by him some years ago, he had endeavored to show that itching had its origin in the nerve endings in the epidermis. He believed that the disturbance of the original and primitive sense of contact was the real cause of itching. Connective tissue diseases did not cause itching, even when superficially located. For example, mycosis fungoides was an affection closely allied to sarcoma, and yet was a pruriginous disease. It produced effects on the skin similar to those of eczema, and hence was marked by great itching. An erythematous disease was not per se a pruriginous one. The morbid sensation was more apt to be that of smarting or burning. The instinctive impulse in scratching was to attack and remove an irritating something which was vexing the sense of contact. Smarting of the skin had a different mode of production, and required different treatment. Urticaria was liable to occur in nearly all irritative affections associated with hyperesthesia. In the production of the wheal a disorder of the unstriped muscles of the skin and of the blood vessels was concerned. Scratching always aggravated the condition. In a number of papular pruriginous diseases it was a fact that hypertrophy of the erectores pili was present, pointing to the part played by these muscles in itching. Of all the inflammatory pruriginous diseases eczema was the one in which trophic changes in the epidermis were the most prominent. Pruritus was apt to be marked if the lesions of a cutaneous disorder were situated in the prickle cell layer. Pruritus was almost always associated with acute disturbances or changes in the epidermis, but might be absent when these changes occurred slowly. Again, pruritus might occur without obvious change in the epidermis, and might be generalized over the body. There could be little doubt that the central nervous system comprised centers controlling the nerves of the skin. In essential pruritus the determining cause was probably to be found in the skin itself. In many cases this cause was an initial hyperesthesia. The common assumption that in the toxemias, in diabetes and in icterus, the itching is due to the direct irritation of toxic matter circulating in the blood, lacked proof. A sudden change to cool, damp weather, or the taking of a cool bath would provoke urticaria in certain nervous and susceptible individuals. There seemed to be a curious interaction between disturbance of the temperature sense, and the sense of contact. In this connection it was interesting to recall the fact that a sensation of burning was sometimes produced in the absence of any obvious lesion of the skin. It was really a form of pruritus, and was often preceded by it. Sexual neurasthenia was sometimes the only discoverable cause of pruritus ani or of pruritus progenitalis. Pruritus was sometimes the result of mental suggestion, as when a person suffered from intense itching in the belief that he was a victim of pediculosis, though examination showed this condition to be absent.

A gouty diathesis or a neurasthenia was often responsible for a pruritus of the anus or vulva, but after a time a form of eczema developed as a consequence of the pruritus. In such cases if the itching were cured the eczema would take care of itself. Again, there were many pure vasomotor disturbances with more or less decided trophic changes, which must be attributed to a pruritus and the consequent scratching. There was a diversity of opinion regarding the position of the papule in the prurigo of Hebra, but it was undeniable that much of the trophic change in this disease was solely the result of scratching. In the treatment of all pruriginous affections measures directed to the relief of itching were of the first importance. Allay the itching and an important etiological factor, and often the essential one in the disease, would be eliminated.

Dr. C. E. Quimby said that he had been in the habit of considering the burning sensation experienced after going to bed as a forerunner of apoplexy. This condition he had found almost invariably associated with a persistently high arterial tension. This burning sensation was apt to occur chiefly in the lower extremities below the knees, and according to his experience these cases almost invariably showed a marked accentuation of the second sound of the heart.

Dr. J. W. S. Gouley said that he had listened to this paper with a great deal of interest because it was marked by a high degree of scholarship which was unfortunately rare among the members of the medical profession at the present day. If greater care were taken generally in the preparation of medical papers they would live long after their presentation. He would urge the younger members to write their papers at least three times—four times would not be out of the way. Such a paper as that just presented by Dr. Bronson would live, and would be quoted a hundred years from now.

Dr. Bronson said that it had been his experience that neither the vasomotor nerves nor the blood vessels had anything to do with the burning sensation referred to by Dr. Quimby. He believed it was entirely a matter involving the nerves connected with the temperature sense. The nerves in the lower extremities were less highly developed, and itching was apt to be most intense here. The reason for itching occurring so commonly in the genitals was probably to be found in the perturbations to which these parts were subjected. Moreover the aphrodisiac sense was of a low order, and it was just in nerves of this order that itching was most apt to occur. In answer to Dr. Morris he would answer that it was only a matter of relative degree.

NORTHWEST MEDICAL SOCIETY OF PHILADELPHIA.

Stated Meeting, Held January 6, 1902.

The President, Wendell Reber, M.D., in the Chair.

The Preparation of the Patient for Nose and Throat Operations Under Local Anesthesia.—This was the title of a paper read by Dr. Nathan G. Ward, in which he directed attention to the importance of careful preparatory treatment for all operations on

the nose and throat, which he felt was often neglected when the operation was done under local anesthesia, another deleterious factor being that too frequently the patient insisted on having the operation done on Sunday or at night and returning to work the following day. The advantages of preliminary treatment were first brought to his attention several years ago, in an operation on a case of deviated septum, in which in order to induce the patient to have the operation done under cocaine, he had promised to administer ether, if the operation proved too painful, the preliminary treatment, of course, being administered. The recovery was more rapid than in other cases and this has been the author's uniform experience with the cases prepared and those not. The preparatory treatment should be both local and systemic, the local effort being directed to improving the condition of the mucous membrane by the use of alkaline and oily solutions, containing menthol, carbolic acid, etc. The systemic treatment should be directed principally to the organs of elimination, and consist chiefly of laxatives, diaphoretics and diuretics. So far as antisepsis is concerned, strong solutions of mercuric chloride and carbolic acid are apt to produce too much inflammation, and, therefore, the main reliance must be placed on hydrogen peroxide, and strict cleanliness. Cocaine, in four-per-cent. solution, applied by dipping pledgets of cotton therein and placing on the seat of the operation for 30 minutes to an hour, was thought to give the best results for the primary anesthesia, but for the reinforcement of the anesthesia during the operation, eucaine was recommended, on acount of the possible systemic effects of the cocaine. The application of adrenalin, just before the operation was recommended, as it deepens and prolongs the anesthesia, and tends to bleach the tissues and prevent hemorrhage, although its use is not unattended by drawbacks, as the experience of the author, as well as many others, has been that it tends to increase secondary hemorrhage. Reference was made to several instances which had come under his notice where it was necessary to discontinue the operation for a few moments during its progress, owing to the patient complaining of a choking or smothering sensation referred to the region of the neck, throat and heart, which he ascribed to reflex inhibition transmitted from the areas supplied by the trifacial, glossopharyngeal and recurrent laryngeal nerves to the cardio-inhibitory and pulmonary branches of the pneumogastric. The use of atropine in 1/200 to 1/100 of a grain doses every two to four hours, for from six to twelve hours preceding the operation has been found to lessen this condition.

Accidents and Complications Following Operations on the Nose and Throat.—Dr. Justus Sinexon read this paper in which he commented on the fact that there seemed to be a general belief, not only that the nose and throat would tolerate any operation, but that this region was a rich field for operative procedure. He felt that two great errors into which many rhinologists and laryngologists had fallen into were the tendency to disregard constitutional treatment and employ the knife, and the desire to produce a cosmetic rather than a constitutional effect, entirely forgetting the functions of these organs. Healthy secreting tissue, he felt should not be substituted by non-functionating tissue, merely for the sake of symmetry, and in all cases, prior to operation, the family history, occupation, hereditary predisposition, etc., should be carefully studied, as syphilis, gout, rheumatism, indigestion, cardiac, renal and hepatic disorders, exerting a well-known causative effect upon these conditions. Careful antiseptic operative preparation was recommended, and when operation is necessary it should be done with as little cicatricial tissue as possible, and all the pieces of bone, cartilage, etc., should be removed, as otherwise they will form an obstruction to drainage and reparation. The use of alkaline douches as a post-operative treatment in the nasal cavities was thought by many to be of value. In all cases of epistaxis, it was recommended that careful consideration be given to the constitutional condition of the patient, and the use of cocaine solutions should be avoided, as the subsequent hyperemia is likely to cause recurrence of the nasal hemorrhage.

While the author did not agree absolutely with the assertion of Woake that polypus of the nose was not a disease per se, yet he felt that the 33 cases reported by Grünwald, in which he found three cases of empyema of the maxillary sinus, 14 of the ethnoid, one of the sphenoid, and in eleven of which there was combined empyema of the several cavities were indicative of the frequency of the occurrence of sinusitis as a symptom, if not a primary cause of the polypoid growth. Operation should be as near the base of the tumor as possible and care should be taken to avoid injury to the osseous growths. This method will insure drainage of the normal sinus openings and prevent infection of the cavities unless it already exists. Curetting and the application of caustics following such operations should be avoided, as they are liable to destroy the surrounding tissue, and infect the sinus. Rayser has reported a case of meningitis with infection of the superior maxillary sinus following such an operation. Stork has reported five cases of meningitis, one of which was fatal, following operation with the curette, for nasal ulcers. Ozena, while it is frequently associated with sinus disease, may also occur coincidently with undetermined hereditary syphilis.

In abscess of the septum care should be taken to avoid injury to the blood vessels, as interfering with the nutrition in this way may cause permanent perforation, and, unless there is a history of injury or marked ulcerative process of the septum, syphilis and other constitutional causes should be considered.

One of the chief dangers in operation on the turbinates is that owing to their close proximity to the sinus openings, they are liable during the process of repair to infect these cavities and cause great suffering or even death. A less serious danger, but one causing much suffering, following operation on the turbinates and also on septal spurs, is synechia, which may be the cause of even more functional disturbance than the original condition. In operations for the removal of septal spurs care should be taken to differentiate between an osseous growth and an acute deflection, which is often very difficult and in the use of the nasal saw for exostosis, care should be taken to avoid injury to the mucous membrane. If the tampon be used as a dressing, it should not be packed so firmly or retained sufficiently long to cause necrosis of the flap. Another untoward effect frequently noticed is empyema of the adjacent sinus, caused by the closing of the normal opening from the edema following the operation, and infection through the same channels may be the cause of severe headaches, etc., which would indicate the necessity for careful post-operative attention.

Following operation for the removal of adenoids may result fatal hemorrhage, injury to the Eustachian tubes, causing deafness, or to the cornea, causing impairment of respiration which is very frequently not noticed until later in life. Chronic deafness may also result as a sequela of adhesive or cicatricial contraction of the orifices of the Eustachian tubes or as a result of the inflammation attendant upon abscess of

the tonsils, to avoid which operation should always be done as soon as the abscess is demonstrated. In view of the number of fatal operations following tonsillotomy careful observation should be made of any abnormal condition of the arteries before operation.

Dr. E. B. Gleason, in discussing these papers stated that the pre-operative treatment of the throat had attracted his attention only when the health of the patient was much below par, and referred to the practice of Seyler of employing solutions of iodide of potash and gelatine solutions in order to relieve congestion and make the nasal secretions as nearly normal as possible. The use of antiseptics immediately before operation was thought to be derogatory, as by many the nasal secretions are considered to be somewhat antiseptic, and the abundance of the discharge after the operation tends to wash away bacteria and prevent infection. The character of the nasal secretions can also be improved by the internal administration of iodide of potash and mercury. The speaker referred to the practice of Dr. Fox, who administers a mixture composed of one grain of bichloride of mercury, two drams of iodide of potash and three ounces of water, in teaspoonful doses three times a day, before operating on the afflicted eye.

In regard to anesthesia he felt that better results could be obtained by the use of a weak solution of cocaine for some time than by employing a strong solution for a shorter period, his practice being to soak the nose for about half an hour in a three-per-cent. solution of cocaine, then spray it with a one to one-thousandth solution of adrenalin. While he felt that the use of adrenalin was the cause of post-operative hemorrhage in some cases, it is of great value in operations where a field free from blood is desired.

In regard to the bad results following nasal operation, he did not think they were as bad as sometimes portrayed, and stated that he could recall but two cases occurring in his own practice, one of which was a dental student, who had been working in the dissecting room of the University of Pennsylvania, in which case the sawing out of an exostosis caused enough fever to keep the patient in bed for two or three days. The other case was a case of sepsis following a deflected nasal septum, occurring in a young man whose health was below par. The patient insisted upon going about the city the day after the operation, and on the third day after the operation he had a temperature of 103°F. or 104° F., with severe frontal headache and discharge from the frontal sinus. His frontal headache disappeared in a few days and he made a good recovery. The majority of post-operative complications he inclined to think were due to some mistake in the after-treatment. Severe hemorrhage following nasal operation he did not think was very likely to occur and the possibility of this complication could be lessened by doing the operation as rapidly as possible. When hemorrhage does occur the application of a piece of cotton saturated in peroxide of hydrogen and wrapped around the end of an Allen's probe and pressed upward against the clots usually gives relief. He recommended that only the hypertrophied portion of the adenoid or tonsil should be removed, as the removal of the whole gland was more apt to induce hemorrhage, and he had observed cases where hemorrhage had occurred when the condition had been previously treated by the galvano-cautery. Scarred tissue is most likely to form when the operation is on the anterior portion of the septum, the secretions usually being sufficient to prevent its formation further back, and this same result is usually avoided by being sure to make a perfectly flat union. The use of a small quantity of iodoform gauze for the first 12 or 24 hours was thought to facilitate healing, but it should be removed at the end of that time.

Dr. Hugh P. McAniff reported two cases of inhibition which had come under his observation. The first occurred in a girl, about twenty years of age, on whom he was about applying a two-per-cent. solution of cocaine for the removal of an adenoid from the turbinate, when the patient fainted and it required about one hour to restore her. The other case was a man, aged about twenty-five years, to whom chloroform had been administered prior to the opening of an abscess on the elbow. About the time of making the incision, respiration ceased, the patient became unconscious, compelling the abandonment of the operation, consciousness being restored in about five minutes by the application of two or three drops of aromatic spirits of ammonia.

Dr. A. B. Kirkpatrick stated that he had three or four cases of eczema following infection from the discharge in hay fever, and had usually secured good results from the employment of equal parts of iodine and carbolic acid. In regard to post-operative complications, he felt that with proper antiseptic precautions the danger was very small and could recall but one case which had occurred in his own practice, which was an operation for a small septal spur, the patient being very anemic and he attributed the sepsis which followed the operation largely to the heart condition. In regard to hemorrhage, he stated that he had observed this condition in three or four tonsillotomies, where the prior treatment had consisted of the galvano-cautery and nitrate of silver, but outside of these cases had had no difficulty in controlling the hemorrhage.

Dr. Wendell Reber referred to the comparative rareness with which infectious conditions seemed to occur in the nasal operation, this condition being a source of considerable apprehension in ocular operations, Dr. Lippincott of Pittsburg, recommending spraying of the nasal cavities one hour before doing an operation on the eye. It was felt to be error to do any ocular operation where there is disease of the lacrymal cavities, as many infections of the eye are believed to be contracted in that way.

Dr. Justus Sinexon, in closing, referred to a case in which he had employed nitric acid for enlarged turbinates, resulting in sloughing, the recovery being very tedious. He also referred to two cases of severe hemorrhage which he had observed after operation on the turbinates, one lasting 12 hours and the other continued for two days. The employment of a gelatine and iron solution was the only thing that would control the hemorrhage. One of the great derogatory factors in the practice of rhinology he felt was the taking of a patient in off the street and immediately doing an operation, and he felt that this method should be discouraged.

BOOKS RECEIVED.

The MEDICAL NEWS *acknowledges the receipt of the following new publications. Reviews of those possessing special interest for the readers of the* MEDICAL NEWS *will shortly appear.*

GUY'S HOSPITAL REPORTS. Vol. LVII. J. & A. Churchill, London.

INTERNATIONAL CLINICS. Vol. IV. Twelfth Series, 1903. J. B. Lippincott Company, Philadelphia.

TRANSACTIONS OF THE AMERICAN GYNECOLOGICAL SOCIETY. Vol. 27. 1902. W. J. Dornan, Philadelphia.

ATLAS AND EPITOME OF HUMAN HISTOLOGY. By Dr. J. Sobotta. 8vo, 248 pages. Illustrated. W. B. Saunders & Company, Philadelphia and London.